OAK RIDGE NATIONAL LABORATORY

MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

REQUEST FOR INFORMATION

October 19, 2015

Radio Frequency Transponders Usable at Army Test Ranges

Notice Number: **RFI-DANIEL-102115**

Issue Date: October 22, 2015

Response Due Date: November 13, 2015 by 10:00 AM Eastern Time

E-mail: Correspond directly with Lisa Hawk at hawklp@ornl.gov. Questions submitted by a method other than email will not be accepted or answered. Please ensure that your email response has "**RFI-DANIEL-102115**" in the subject line.

Issued by: This Request for Information (RFI) is being issued by UT-Battelle, management and operating contractor of the Oak Ridge National Laboratory (ORNL) for the US Dept. of Energy (DOE).

Background: ORNL is a multi-program science and technology laboratory managed for the DOE by UT-Battelle, LLC. Scientists and engineers at ORNL conduct basic and applied research and development to create scientific knowledge and technological solutions that strengthen the nation's leadership in key areas of science; increase the availability of clean, abundant energy; restore and protect the environment; and contribute to national security. ORNL is currently supporting the Army Project Director Counter-Rockets, Artillery, and Mortars (PD C-RAM) on the Range Radar Replacement Program (RRRP). The RRRP is in the requirements development stage of replacing the legacy instrumentation radars at several Army Test Ranges. The Army anticipates receiving various X-band radar designs from vendors during the Request for Proposal (RFP) stage and needs to understand the impact that such designs may have on transponder tracking at the Army Test Ranges. **The current transponders utilized at the Army Test Ranges are C or X-band, high peak power, very short pulse width transponders that adhere to the Range Commands Council (RCC) 262-14 standard.**

RFI Purpose:
This RFI is a market survey to help identify potential sources that are interested in and capable of providing a transponder that can be efficiently paired with alternative radar designs that include Active Electronically Steered Arrays (AESA), Multi-Frequency Continuous Wave (MFCW), Frequency Modulated Continuous Wave (FMCW), and pure CW designs. The new transponder must meet the following objectives:

1. The transponder shall allow a minimum of three different radars to simultaneously track the same transponder during flight.
2. The transponder shall be designed to function with the radar to allow the transponder to be tracked with a 99% Probability of Detection (P_d) and a Probability of False Alarm (P_{fa}) of 1e-6 out to 225 km allowing for 30 dB of losses for link fading/shadowing and transponder antenna pattern nulls and a maximum dwell time of 10 ms.
3. The transponder shall be designed to function with the radar to allow the radar to provide the following accuracies and resolutions when tracking the transponder at a distance of

60 km allowing for 30 dB of losses for link fading/shadowing and transponder antenna pattern nulls and a maximum dwell time of 10 ms:

   a. Angle Accuracy: 250 urad
   b. Range Accuracy: 5 m
   c. Range Resolution: 15 m
   d. Velocity Accuracy: 1 m/s
   e. Velocity Resolution: 5 m/s

4. The transponder shall meet the size, weight, and power (SWAP) as specified in RCC Standard 262-14 to ensure interoperability and compatibility with existing Systems Under Test (SUTs) and test range infrastructures.
5. The transponder shall pass the Environmental, Quality Assurance, and Quality Testing requirements of RCC Standard 262-14, excluding the frequency test requirements that are not applicable to the design. If new transponder testing methodologies are required, please suggest alternate testing methods that can be incorporated into the RCC 262-14 Standard.

Since the radar design for which the transponder is to be matched has not been solidified at this time, it is not necessary to present detailed designs for all possible transponder types. Please concentrate your efforts on the technologies stated above (AESA, MFCW, FMCW, and CW). It is also not necessary to address all of the stated technologies if your company only intends to pursue specific technologies.

Responses Due: All responses will be electronic format, and emailed to hawklp@ornl.gov. **All responses must be received no later than November 13, 2015, 10:00 am, Eastern Standard Time.**

Responses to this RFI must address the following:

1. Your firm's capability to meet the stated objectives
2. Your firm's past performance in meeting the stated objectives
3. A list of references, including: Company Name, Contact Name, Contact's phone number and email address
4. Conceptual design of the transponder(s).
5. Estimated performance of the conceptual design(s) including a spreadsheet that identifies the influence of all estimated components on the overall system performance. (Equivalent to a Blake Chart analysis).
6. Suggested modifications to the RCC 262-14 standard to encompass the transponder design(s).
7. A rough order of magnitude estimate to include:
   a. Identification of cost driving elements in the design
   b. Identification of cost driving requirements
   c. Identification of performance vs. cost trade space areas in the design

Disclaimer

This RFI neither constitutes a solicitation, Request for Proposal (RFP), Invitation for Bid, or promise to issue an RFP in the future, nor does it restrict UT-Battelle to an ultimate acquisition approach. This RFI is issued solely for information and planning purposes and should not be construed as a commitment of any kind.