Pacific Northwest NATIONAL LABORATORY

Homeland Security
Science and Technology

Emergency Management of Tomorrow Research

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) is partnering with Pacific Northwest National Laboratory (PNNL) to execute the Emergency Management (EM) of Tomorrow Research (EMOTR) program to assess current research in EM, elicit capability needs from practitioners, and identify where technology, such as artificial intelligence (AI), may benefit the future of EM and emergency operations centers (EOCs). The project is delivering a phased and iterative approach to inform future research, development, and investments for the EM community.

Assessing the Current Research and Development Landscape

PNNL conducted a landscape assessment of EM research and development at academic institutions, national laboratories, and other U.S. research institutes to curate relevant and timely publications. From August to November 2023, PNNL analysts used a suite of research databases, key search terms, and analytical tools to filter 36,000 journal articles and 1,600 patent publications to a manageable dataset of 300-plus, peer-reviewed and open-source publications (years 2008–2023) captured in an annotated bibliography. The annotated bibliography is formatted in a sortable spreadsheet that allows EM personnel to review recent research in terms of capability needs identified through EMOTR outreach and literature reviews, including data integration and communication, pandemic response, resource management, and threat and hazard detection. The landscape assessment and annotated bibliography are available by request to **emotr@pnnl.gov**.

METHODOLOGY

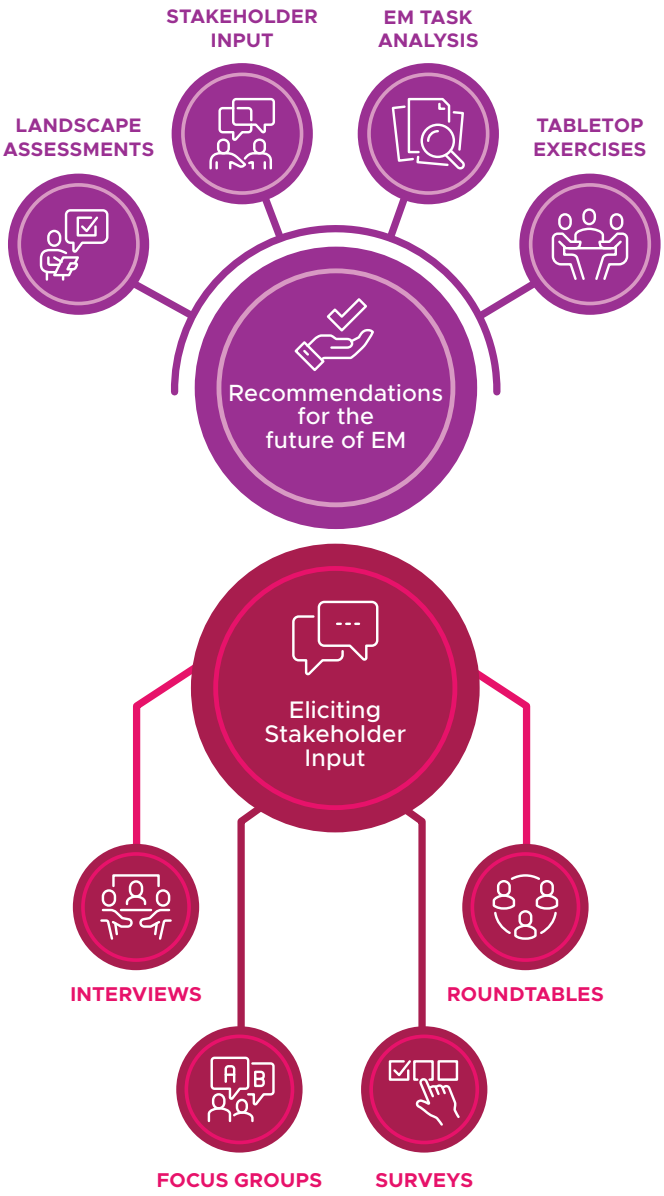
36,000
peer-reviewed publications

1,526
peer-reviewed publications

OUTCOME

300+
annotated bibliography entries

CAPABILITY NEEDS | **RESEARCH TOPICS** | **NOVEL TECHNOLOGIES**



Eliciting Stakeholder Input

PNNL is connecting with EM personnel nationwide both virtually and in-person through interviews, focus groups, surveys, and conferences to validate the landscape assessment and capture additional EM-focused capability gaps. These efforts are building an understanding of the current state of information sharing, evaluating the efficiency of current research programs in closing EM capability gaps, and encouraging community coordination to inform overall efficacy of EM research investments. PNNL will also survey both the AI and EM landscape and connect with subject matter experts to identify areas of synergy and prioritize technologies that will have the most positive benefit to the EM domain and future research and investment.

Connecting AI with EM Capability Needs

PNNL is leveraging the EMOTR findings—technology gaps and capability needs identified through each of the landscape assessments and stakeholder input—into a final assessment and validating through hands-on activities where AI might benefit EM operations and EOCs of the future. Tabletop exercises will engage EM personnel in realistic scenarios to test research hypotheses regarding the impacts of new technologies on emergency operations. The evaluation will focus on how effectively the technologies address the problems as well as the feasibility of applying the new and novel technologies to support EOC functions. Findings will be provided in a recommendations report to DHS to inform future research and investment considerations.

Outcomes

While **EMOTR** outreach and analysis are still in progress, predominant capability needs identified to date include vetting and validating information, resource management, and situational awareness. Persistent barriers to mitigate technology gaps and capability needs include policy, funding, interoperability, and trust.

For more information, contact:

Christina Bapst-Stump, Senior Advisor
DHS Science & Technology Directorate
christina.bapststump@hq.dhs.gov | (202) 725-6632

Ann Lesperance, EMOTR Project Manager
Pacific Northwest National Laboratory
ann.lesperance@pnnl.gov | (206) 528-3223