

W911NF-18-S-0005-FY2023

SOURCES SOUGHT NOTICE

REQUEST FOR WHITE PAPERS

BAA TOPIC A-8.c.1: COLLECTIVE RESILIENCE, READINESS, AND PERFORMANCE

“Network Analysis for Characterizing Team Resilience”

INTRODUCTION

Broad Agency Announcement (BAA) W911NF-18-S-0005 was publicized on SAM.gov and [Grants.gov](https://www.grants.gov) on 1 May 2018. This Sources Sought Notice calls for White Paper submissions in reference to the BAA Topic A-8.c.1: COLLECTIVE RESILIENCE, READINESS, AND PERFORMANCE. The United States Army Research Institute for the Behavioral and Social Sciences (ARI) Broad Agency announcement W911NF-18-S-0005, issued under the provisions of paragraph 6.102(d)(2) of the Federal Acquisition Regulation, provides for the competitive selection of basic and applied research and that part of development not related to the development of a specific system or hardware procurement. A Proposal submitted in response to this BAA and selected for award is considered to be the result of full and open competition and in full compliance with the provisions of Public Law 98-369, “The Competition in Contracting Act of 1984,” and subsequent amendments. Funding of research and development (R&D) within ARI areas of interest will be determined by funding constraints and priorities set during each budget cycle. Any award related to the submission of a White Paper and subsequent Proposal requested by this Notice is subject to funds availability and priorities. ARI may choose not to select any new award due to unavailability of funds or other factors.

The sequence of steps leading to an award is:

- 1) Request for White Paper initiated by ARI through this Sources Sought Notice
- 2) Submission of a timely White Paper **no more than five pages in length** to the POC for the U.S. Army Contracting Command, wilveria.a.sanders.civ@army.mil, and copy furnish (CC) the ARI Technical Point of Contact (TPOC), cassie.a.berry.civ@army.mil.
- 3) Written or telephonic feedback provided to the Offeror regarding the White Paper’s scientific merit and potential contributions to the Army mission as per established criteria presented in Part III
- 4) If the White Paper merits it, a request of a formal proposal initiated by ARI
- 5) Submission of a timely, formal proposal
- 6) Evaluation of the formal proposal as per established criteria presented in Part III
- 7) Award for selected proposal based on availability of funds or other factors

This sequence allows earliest determination of the potential for funding and minimizes the labor and cost associated with submission of a full proposal that has minimal probability of being selected for funding.

Note that an interested Offeror **must** submit a White Paper electronically in order to be eligible to submit a formal proposal under this Notice. This Notice requires that a White Paper be submitted electronically no later than **31 October 2022, 5:00 PM Eastern Daylight Time**. See Part V, Deadlines, for additional details. BAA W911NF-18-S-0005 allows several potential instrument types (e.g., contract, grant, cooperative agreement) to result from a successful proposal. For this Notice, the intention of the Government is to award a contract.

THOSE SUBMITTING A WHITE PAPER/PROPOSAL ARE CAUTIONED THAT ONLY A GOVERNMENT CONTRACTING OR GRANTS OFFICER CAN OBLIGATE THE GOVERNMENT THROUGH AWARD OF A LEGAL INSTRUMENT INVOLVING EXPENDITURE OF GOVERNMENT FUNDS.

This Sources Sought Notice for a Requested White Paper consists of seven parts as follows:

- Part I: Research and Development Interests of the Requested White Paper
- Part II: Preparation and Submission
- Part III: Evaluation Criteria
- Part IV: Feedback
- Part V: Deadlines
- Part VI: Inquiries
- Part VII: References

ACC (APG) RTP Agency Point of Contact:

The POC for the US Army Contracting Command (Aberdeen Proving Ground) Research Triangle Park Division is: Ms. Wilveria Sanders, (919) 549-4328, wilveria.a.sanders.civ@army.mil.

ARI Agency Point of Contact:

The ARI POC for technical matters for this White Paper topic is: Dr. Cassie A. Berry, (571) 595-6939, cassie.a.berry.civ@army.mil.

I. RESEARCH AND DEVELOPMENT INTERESTS OF THE REQUESTED WHITE PAPER:

The United States Army Research Institute for the Behavioral and Social Sciences is the Army's lead agency for the conduct of research, development, and analyses for the improvement of Army readiness and performance via research advances and applications of the behavioral and social sciences that address personnel, organization, training, and leader development issues. ARI contracts with educational institutions, non-profit organizations, and private industry for research and development (R&D) in different areas, including the areas specifically identified in Paragraph 8 of W911NF-18-S-0005. Efforts funded under this White Paper request will only include Applied Research and/or Advanced Technology Development.

Applied Research provides a systematic expansion and application of knowledge to design and develop useful strategies, techniques, methods, tests, or measures that provide the means to meet a recognized and

specific Army need. Applied Research precedes system specific technology investigations or development, but it should have a high potential to transition into the Advanced Technology Development (ATD) Program.

The ARI ATD Program includes the development of technologies, components, or prototypes that can be tested in field experiments and/or simulated environments. Projects in this category have a direct relevance to identified military needs. These projects should demonstrate the general military utility or cost reduction potential of technology in the areas of personnel selection, assignment, and retention; training strategies and techniques; leader education and development; performance measurement; and team and inter-organizational mission effectiveness. These projects should be focused on a more direct operational benefit and if successful, the technology should be available for transition.

WHITE PAPER TOPIC: Network Analysis for Characterizing Team Resilience

The Army Talent Management Strategy recognizes the need to develop resilient Soldiers to improve Soldier, leader, and team performance (U.S. Department of the Army, 2016). The Army Modernization Strategy (AMS) identifies resilience as a necessary component in maintaining a competitive advantage (U.S. Department of the Army, 2019a). Furthermore, the Army People Strategy lists resilience as a capability that defines the Army profession and includes physical and mental resiliency as an important element in increasing Total Army readiness (U.S. Department of the Army, 2019b). Resilience is a team enabler; ensuring units are highly resilient and able to adapt in adverse conditions is essential to Army readiness. Effectively assessing resilience at the unit level and understanding the factors that enable and reduce it is important in being able to develop resilience. For Army units to remain resilient in an ever-changing operational environment where adverse conditions are common, we must understand the dynamics within small units that enable them to be effective.

Members of teams are interdependent, their duties are connected to each other, and these interactions and relationships are complex and dynamic (Mathieu et al., 2019; Park et al. 2020). Social network analysis effectively captures these complex patterns of relationships, perceptions, and interactions between members of a team (Zohar & Tenne-Gazit, 2008). Using social network analysis to investigate whether and how the pattern of communication among team members influences team resilience would be a novel approach to understanding team resilience within small Army units (e.g., squads or platoons). Understanding the relationship between communication patterns and resilience could help to inform personnel selection decisions, training challenges, talent management, and team building in the effort to develop resilience. The Army could benefit from developing a framework incorporating social network variables to better understand team resilience.

Previous research has found a positive relationship between social network variables (e.g., centrality, density of group communication, etc.) and team performance. Social network analysis has been used to assess team processes and emergent states, such as cohesion and climate (Park et al., 2020; Zohar & Tenne-Gazit, 2008). Zohar and Tenne-Gazit (2008) found relationships between transformational leadership, climate strength, and social network variables. Applying a similar methodology in evaluating team resilience could lead to similar insights. Team resilience has been conceptualized as a latent construct which gives rise to behavioral resilience manifestations when teams are stressed. An example of a behavioral resilience manifestation is coordination between team members (Tannenbaum et al., 2022). Differing levels of coordination between team members could present as differing patterns of communication and social connections which could impact team resilience.

Applying a social network analysis using a survey methodology (similar to Zohar & Tenne-Gazit, 2008) to team resilience in Army small teams will begin to assess the relationship between the pattern of team member interactions (i.e., communication) and a team's resilience. This type of analysis can reveal which

team members which team members have critical connections when the team experiences adverse conditions. In addition, this method can assess whether there are differences in patterns of communication, linkages, and/or centrality for teams with different levels of resilience. We propose to examine these issues by assessing the social patterns (i.e., member linkages, centrality, and overall network pattern) as well as the resilience of small Army teams (as assessed by the psychometrically sound unit resilience measure such as the one recently developed by Tannenbaum et al. [2022]). This can be achieved by quantifying the network of connections within small Army units through questionnaires asking team members who they communicate with, and the frequency and nature of their communication. This methodology does typically require data collected from intact teams, allowing for linkages, centrality, density, and overall network pattern to be calculated, analyzed, and visualized to understand how social network patterns in teams influence team resilience.

The purpose of this project is to develop a framework that will help the Army better understand how team social network patterns influence team resilience. This framework should include guidance to assist Army unit leaders in identifying key roles, patterns, and linkages within their units and recommend appropriate interventions to enhance those patterns to improve communication and resilience. Additionally, this research would develop an understanding of what teams or team members are likely to be more resilient, the links between crucial team members, and how those links emerge during adverse events requiring resilience. The Army can use this information to design training and intervention programs targeted at bolstering the resilience of its small units. By identifying the critical interactions and processes of crucial individuals within these small units, the Army would be more effective at managing talent and at building stronger, more effective teams for future missions.

OBJECTIVES

In order to meet the research objectives under this request:

- 1) The Offeror shall describe the methods that they will use to answer the following questions while being informed by the integration of the current scientific literature and Army doctrine:
 - a. Can the pattern of team member interactions (i.e., communication) predict a team's resilience?
 - b. Which team members have critical connections when the team experiences adverse conditions (i.e., a disruptive event, stressor, challenge)?
 - c. Do resilient teams demonstrate a different pattern of communication, linkages, and/or centrality when compared to non-resilient teams?
 - d. How will the Offeror decide whether aggregation of individual-level data is appropriate? If deemed appropriate, how will the data be aggregated?
 - e. What statistical analyses will be used to assess these relationships?
 - f. What are the benefits and risks of the method(s) chosen?

The award will be approximately a 30-month (6-month base, two 12-month options) period of performance with a budget not to exceed \$700,000.

The Army Contracting Command- Aberdeen Proving Ground, RTP Division has the authority to award a variety of instruments, to include contracts, grants, and cooperative agreements. The ACC (APG) RTP Division reserves the right to use the type of instrument most appropriate for the effort proposed.

II. PREPARATION AND SUBMISSION OF A WHITE PAPER:

Preparation of White Paper

A White Paper should focus on describing details of the proposed research for both the base and option approach, including how it is innovative and how it could substantially advance the state of the science. Army relevance and potential impact should also be described, as well as an estimate of total cost for both the base and option approach. White Papers should present the effort in sufficient detail to allow evaluation of the concept's technical merit and its potential contributions to the Army mission.

A White Paper must be limited to five (5) pages plus the cover page and an addendum in which the Offeror must include a biographical sketch (up to 300 words per individual) of all key personnel (i.e., Principal Investigators and Co-Principal Investigators) who will perform the research, highlighting their qualifications and experience as discussed below. All files and forms must be compiled into a single PDF file or MS Word document before submitting. Reviewers will be advised that they are only to review the cover page and up to five pages plus the addendum. Any pages submitted in excess of the five (5) page limit will not be reviewed or evaluated.

TECHNICAL INFORMATION FOR A WHITE PAPERS:

1. Technical Approach: A detailed discussion of the effort's scientific research objectives, approach, relationship to similar research, level of effort, and estimated total cost; include the nature and extent of the anticipated results, and if known, the manner in which the work will contribute to the accomplishment of the Army's mission related to this request and how this would be demonstrated.
2. Requests for Government Support: The type of support, if any that the Offeror requests of the Government (such as facilities, equipment, demonstration sites, test ranges, software, personnel or materials) shall be identified as Government Furnished Equipment (GFE), Government Furnished Information (GFI), Government Furnished Property (GFP), or Government Furnished Data (GFD). Offeror shall indicate any Government coordination that may be required for obtaining equipment or facilities necessary to perform any simulations or exercises that would demonstrate the proposed capability.
3. Key Personnel Biographical Information: As an addendum to the White Paper, the Offeror must include a biographical sketch (up to 300 words per individual) of all key personnel (i.e., Principal Investigators and Co-Principal Investigators) who will perform the research, highlighting their qualifications and experience.

RESTRICTIVE MARKINGS ON WHITE PAPERS:

1. The Offeror must identify any proprietary data the Offeror intends to be used only by the Government. The Offeror must also identify any technical data or computer software contained in the White Paper that is to be treated by the Government as limited rights or restricted rights respectively. In the absence of such identification, the Government will assume to have unlimited rights to all technical data or computer software presented in the White Paper. Records or data bearing a restrictive legend may be included in the White Paper, but must be clearly marked. It is

the intent of the Army to treat all White Papers as procurement sensitive information before the award and to disclose their contents only to Government employees or designated support contractors for the purpose of procurement related activities only. Classified, sensitive, or critical information on technologies should not be included in a White Paper.

2. An Offeror is cautioned that portions of White Papers may be subject to release under terms of the Freedom of Information Act, 5 U.S.C. 552, as amended.

Submission of White Paper

White Papers must be submitted by e-mail to the POC for the U.S. Army Contracting Command, wilveria.a.sanders.civ@army.mil, and cc'd to the ARI Point of Contact (POC), cassie.a.berry.civ@army.mil, in electronic MS Word document format or PDF file format. **Cite “ARI BAA W911NF-18-S-0005Y, Network Analysis for Characterizing Team Resilience” in the e-mail subject line.**

III. EVALUATION CRITERIA:

A White Papers and full Proposals received in response to this request will be evaluated by the ARI designated point of contact identified in this request using the following factors/criteria:

1. Overall scientific and/or technical merits of the proposed research: The Offeror must demonstrate a thorough understanding of the research problem and articulate a clear approach to addressing the research objectives. The proposed approach must be based on feasible and realistic scientific methods and provide the Government with a high level of confidence of successful completion within proposed timeline.
2. Potential contributions of the effort to the U.S. Army Research Institute’s mission: In addition to showing how the proposed research aligns with the solicited topic, the Offeror must also specify how the proposed research will contribute to or advance the current U.S. Army Research Institute’s behavioral and social science research mission.
3. The Offeror’s capabilities, related experience, facilities, techniques or unique combination of these which are integral factors for achieving the proposed research objectives: the Offeror must demonstrate relevant organizational capabilities [e.g., experience, facilities, techniques] beyond individual capability to ensure the proposed research objectives can be achieved by the organization as a whole.
4. The qualifications, capabilities, and experience of the proposed Principal Investigator and other key personnel who are critical to the achievement of the proposed research objectives: The Offeror must demonstrate that the key personnel have the education and experience necessary to successfully complete the research objectives. Personnel capabilities need to be aligned with the expertise needed to achieve the required research objectives.
5. The Offeror’s record of past performance: Past performance information obtained from the Offeror’s White Paper, centralized past performance databases, and other sources will be used to evaluate past performance on projects of similar size, scope, and complexity to determine timely compliance with Government specifications. For an Offeror with no relevant past performance, the Government may take into account information regarding the past performance of predecessor companies, subcontractors, or proposed personnel that will perform key aspects of the proposed research.

6. Realism, affordability, and appropriateness of proposed costs: The Offeror must demonstrate that the proposed costs are appropriate given the suggested research approach. The Government will also evaluate the proposed costs in relation to the scope of the research objectives and the U.S. Army Research Institute's budget.

7. Current and/or future relationship or interface with ongoing activities in academia and/or industry: The Offeror must demonstrate how the research findings and/or products could inform current or future scientific research, impact industry, and/or meet Army needs and goals.

The request for a proposal will be made based on the overall evaluation of a White Paper using the seven criteria listed above. The overall scientific and/or technical merit of the proposed approach will be weighted more strongly than all of the other factors combined. A request for proposal may not necessarily be made to the lowest proposed price. During the evaluation of White Papers, ARI's POC for technical matters may request a discussion with an Offeror, but discussions are not guaranteed nor required for competition and award purposes. ARI's POC for technical matters reserves the right to evaluate a White Paper and request a proposal without discussions. The Offeror's initial submission should contain the Offeror's best terms from a technical and price standpoint. Once a full proposal has been requested, all communications must go through the POC for the U.S. Army Contracting Command.

If the White Paper evaluation results in the request and submission of a full proposal, the proposal will be evaluated by a panel of scientific peers using the same factors/criteria as those listed above under Evaluation Criteria. A request for a full proposal does not guarantee an award. The decision to award will be based on feedback from the panel, considerations presented by ARI's POC for technical matters identified in this document, and other factors like budgetary constraints. ARI may choose not to select any award due to unavailability of funds or other factors.

IV. FEEDBACK:

Written or telephonic feedback will be provided to the Offeror regarding the White Paper's scientific merit and potential contributions to the Army mission. If the Government decides to request a full proposal, a written request will be sent to the Offeror. The Written Request will, at a minimum, invite a full proposal. The request may also include feedback intended to improve the proposal's potential for award.

V. DEADLINES:

Electronic versions of the White Paper must be received by the POC for the U.S. Army Contracting Command and the ARI POC, with e-mail subject line **"ARI BAA W911NF-18-S-0005Y, Network Analysis for Characterizing Team Resilience"** by e-mail no later than **5:00 PM Eastern Daylight Time on 31 October 2022**. Any extension to the White Paper submission deadline will be posted to SAM.gov as an amendment to this Notice. Note that a timely White Paper received under this Notice will be evaluated and considered for proposal requests throughout the period beginning **31 October 2022**, and ending **31 January 2023**. **An extension of this timeline may be granted based on the number of White Papers submitted or other factors out of the control of the designated point of contact reviewing the White Papers. An Offeror will be notified by email if the White Paper evaluation timeline is extended beyond 31 January 2023.**

Instructions for the submission of a full Proposal will be provided by the U.S. Army Contracting Command to an Offeror invited to submit based on the evaluation of their White Paper.

An Offeror is responsible for submitting an electronic White Paper or full proposal so as to be received and accepted at the Government site indicated in this Notice no later than the date and time specified above. When sending electronic files, an Offeror shall account for potential delays in file transfer from the originator's computer to the Government website/computer server. An Offeror is encouraged to submit their response early to avoid potential file transfer delays due to high demand or problems encountered in the course of submission.

An Offeror should receive confirmation of delivery at the Government site, not just successful relay from the Offeror's system. Acceptable evidence to establish the time of receipt at the Government site includes documentary and electronic evidence of receipt maintained by the Government site. All submissions shall be submitted before the deadline identified above in order to be considered – no exceptions.

If an emergency or unanticipated event interrupts normal Government processes so that a White Paper or full proposal cannot be received at the site designated for receipt by the date and time specified above, then the date and time specified for receipt will be deemed to be extended to the same day and time specified in this Notice on the first work day on which normal Government processes resume.

An Offeror agrees to hold the terms of their White Paper and any subsequent proposal valid for 180 calendar days from the date of submission.

VI. INQUIRIES:

ACC (APG) RTP Agency Point of Contact (Contractual Questions)

The POC for the US Army Contracting Command (Aberdeen Proving Ground) Research Triangle Park Division is: Ms. Wilveria Sanders, (919) 549-4328, wilveria.a.sanders.civ@army.mil.

ARI Agency Point of Contact (Technical Questions)

The ARI POC for technical matters for this White Paper topic is: Cassie A. Berry, (571) 595-6939, cassie.a.berry.civ@army.mil.

VII. REFERENCES:

U.S. Department of the Army (2016). *U.S. Army talent management strategy: Force 2025 and beyond*. Headquarters, Department of the Army.

U.S. Department of the Army (2019a). *Army modernization strategy: Investing in the future*. Headquarters, Department of the Army.

U.S. Department of the Army (2019b). *The Army people strategy*. Headquarters, Department of the Army.

Mathieu, J. E., Gallagher, P. T., Domingo, M. A., & Klock, E. A. (2019). Embracing complexity: Reviewing the past decade of team effectiveness research. *Annual Review of Organizational Psychology and Organizational Behavior*, 6, 17-46.

Park, S., Grosser, T. J., Roebuck, A. A., Mathieu, J. E. (2020). Understanding work teams from a network perspective: A review and future research directions. *Journal of Management*, 46, 1002-1028.doi: 10.1177/0149206320901573

- Tannenbaum, S. D., Mathieu, J. E., Levy, J., Watson, D., Maynard, T., Beard, R., Salas, E., Boyle, B. E., Cato, C. R., Berry, C. A., & Blue, S. N. (2022). The development and validation of an Army team resilience measure. *Military Psychology*. Advanced online publication <https://doi.org/10.1080/08995605.2022.2065154> (DTIC No. AD1168806).
- Zohar, D. & Tenne-Gazit, O. (2008). Transformational leadership and group interaction as climate antecedents: A social network analysis. *Journal of Applied Psychology*, 93, 744-757. doi: 10.1037/0021-9010.93.4.744