

**Opportunity Title:** Multimodal Localization with Autonomy  
**Opportunity Reference Code:** ARL-R-CISD-300083-NCCS

**Organization** DEVCOM Army Research Laboratory

**Reference Code** ARL-R-CISD-300083-NCCS

### **Description About the Research**

The aim of this research is to develop efficient techniques that exploit heterogeneous networks and autonomy for improved direction of arrival estimation and localization (e.g., Low VHF, UHF, and Optical) in both LOS/NLOS scenarios. In addition to exploiting multiple communications modalities, the seamless integration of the different modalities on small ground robotic agents and exploitation of mobility to improve performance of localization is of interest. In addition to heterogeneity in frequency, other unique modalities such as distributed beamforming will also be considered. The main research will focus on seeking a novel implementation of accurate localization of mobile robots while navigating an unknown environment through NLOS communication such that it is possible to build a map of the environment. An existing VHF, RF communication systems as well as an experimental UV-C band communication system will be considered for integration for performance analyses of the different techniques.

*ARL Advisor: Fikadu Dagefu; Jeffrey Twigg*

*ARL Advisor*

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### **About Army Research Directorate (ARD)**

ARL's Army Research Directorate (ARD) focuses on exploiting concept development, discovery, technology development, and transition of the most promising disruptive science and technology to deliver to the Army fundamentally advantageous science-based capabilities through laboratory's 11 research competencies. This intramural research directorate also manages the laboratory's essential research programs, which are flagship research efforts focused on delivering defined outcomes.

### **About Network Cyber & Computational Sciences (NCCS)**

Sciences to enable and ensure secure resilient communication networks for distributed analytics in Multi-Domain Operations.

### **About ARL-RAP**

The [Army Research Laboratory Research Associateship Program](#) (ARL-RAP) is designed to significantly increase the involvement of creative and highly trained scientists and engineers from academia and industry in scientific and technical areas of interest and relevance to the Army. Scientists and Engineers at the CCDC Army Research Laboratory (ARL) help shape and execute the Army's program for meeting the challenge of developing technologies that will support Army forces in meeting future operational needs by pursuing scientific research and technological



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developments in diverse fields such as: applied mathematics, atmospheric characterization, simulation and human modeling, digital/optical signal processing, nanotechnology, material science and technology, multifunctional technology, combustion processes, propulsion and flight physics, communication and networking, and computational and information sciences.

**A complete application includes:**

- **Curriculum Vitae or Resume**
- **Three References Forms**
  - An email with a link to the reference form will be available in Zintellect to the applicant upon completion of the on-line application. Please send this email to persons you have selected to complete a reference.
  - References should be from persons familiar with your educational and professional qualifications (include your thesis or dissertation advisor, if applicable)
- **Transcripts**
  - Transcript verifying receipt of degree must be submitted with the application. Student/unofficial copy is acceptable

If selected by an advisor the participant will also be required to write a **research proposal** to submit to the ARL-RAP review panel for :

- Research topic should relate to a specific opportunity at ARL
- The objective of the research topic should be clear and have a defined outcome
- Explain the direction you plan to pursue
- Include expected period for completing the study
- Include a brief background such as preparation and motivation for the research
- References of published efforts may be used to improve the proposal

A link to upload the proposal will be provided to the applicant once the advisor has made their selection.

**Questions about this opportunity?** Please email

[ARLFellowship@orau.org](mailto:ARLFellowship@orau.org)

**Point of Contact** [ARL](#)

- Eligibility Requirements**
- **Degree:** Doctoral Degree.
  - **Academic Level(s):** Any academic level.
  - **Discipline(s):**
    - **Computer, Information, and Data Sciences** ([1](#))
    - **Engineering** ([2](#))
  - **Age:** Must be 18 years of age