OUTREACH | 01 | UNCLASSIFIED

CF-JET Partner Outreach

The university, manufacturing and graduate research roles SOL is assembling for the CF-JET Army research effort

SOL Engineering Services

PUBLISHED
16 November 2026

READING TIME
4 min

Overview

SOL Engineering Services is exploring a collaborative Army research opportunity: CF-JET, the AI/ML-enabled design and development of an additively manufactured, liquid-cooled jet-impingement cold plate with an optimized carbon fiber target plate. The effort focuses on next-generation thermal management for the high-power electronics used in defense and commercial systems, and it combines advanced manufacturing, thermal-fluid sciences, materials engineering and AI-enabled design methods to develop and validate a lightweight cooling solution.

The work will produce more than a cold plate. Surrogate modeling through SOL's neuro-symbolic framework, trained workflows and a growing engineering database will become a design toolkit that can be used across design, modeling and simulation, and process development and optimization. SOL is assembling a team of university, industry and non-profit partners to carry it out, and this page describes the three partner roles it is looking to fill.

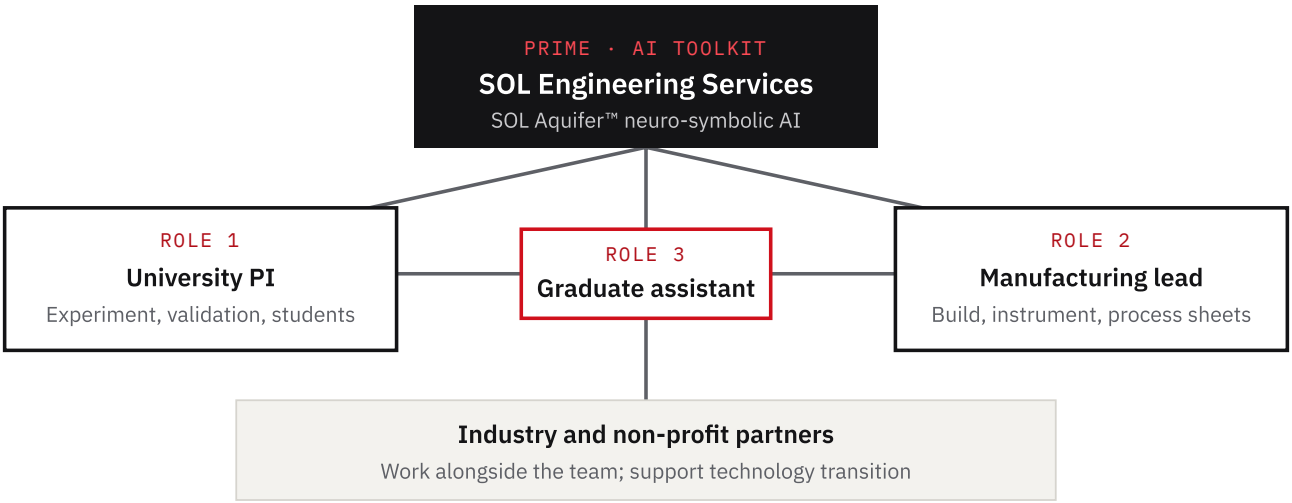
3	8
PARTNER ROLES	DISCIPLINES SPANNED

1. How the Team Fits Together

SOL Engineering Services leads the effort and provides the AI toolkit, SOL Aquifer™. A university principal investigator leads the experimental research; an advanced manufacturing, mechatronics and machine shop

center turns designs into hardware; and a graduate assistant works across all three, alongside industry and non-profit partners (Figure 1).

Figure 1. The CF-JET partner team



Schematic of the roles described in this document.

Table 1. The three roles at a glance

Role	Leads	Delivers	Potential institutions
University principal investigator	Experimental research, student engagement, prototype validation and data-driven engineering analysis	Validated test results and analysis; research opportunities for faculty and students	Alabama A&M University; University of South Florida
Advanced manufacturing, mechatronics and machine shop lead	Fabrication, agent-driven process optimization and experimental infrastructure	Testable hardware, test plans, results documentation and manufacturing process sheets to standard	Drake State Community and Technical College
Graduate assistant (preferably a doctoral student or postdoc)	Day-to-day prototype, testing, data and modeling work across the team	Hands-on results, publications and presentations	To be identified

2. Role 1: University Principal Investigator

The university partner provides technical leadership in experimental research, student engagement, prototype validation and data-driven engineering analysis, working alongside the industry and non-profit partners. Its measurements are what confirm or correct the AI-driven designs, so this role anchors the project's evidence.

2.1 What the role involves

- Leading the experimental research program and the validation of prototypes.
- Engaging students in research, testing and analysis.
- Carrying out data-driven engineering analysis of test results.
- Working with SOL, the manufacturing center and other partners throughout design, build and test cycles.

2.2 What the partner gains

- Meaningful research opportunities for faculty and students.
- Positioning for future defense-related research and technology transition activities.

Potential institutions: Alabama A&M University; University of South Florida.

3. Role 2: Advanced Manufacturing, Mechatronics and Machine Shop Lead

This center supports the design, fabrication and testing of the thermal management system. It turns digital designs into testable hardware, supports the iterative development cycles that AI-driven design depends on, and helps establish the experimental infrastructure for validation. It also implements agent-driven process optimization with SOL's Aquifer neuro-symbolic AI protocol, so the manufacturing process is optimized with the same tools as the design.

3.1 What the role involves

- Additive manufacturing, precision machining and mechatronics.
- Fixture development, prototype assembly and instrumentation support.
- Innovative material development.

- Agent-driven process optimization using SOL Aquifer.
- Close collaboration with engineering researchers and industry partners.

3.2 Deliverables

- Testable prototype hardware for each design iteration.
- Test plans and documentation of results.
- Manufacturing process sheets developed to standard.

The center contributes directly to a cutting-edge, defense-related research effort while giving students and researchers hands-on experience.

Potential institution: Drake State Community and Technical College.

4. Role 3: Graduate Assistant

The project seeks a graduate assistant, preferably a doctoral student or postdoctoral researcher, to work closely with the university PI, the manufacturing and machine shop lead, and SOL Engineering. The project brings together artificial intelligence, advanced manufacturing, innovative material development, mechanical engineering, modeling and simulation, thermal sciences, electronics cooling and experimental testing, and the graduate assistant works across all of them.

4.1 Experience the role provides

- Prototype development and laboratory testing.
- Data analysis, modeling and simulation.
- Mechatronics and AI-assisted engineering design.
- Publications, presentations and workforce development, with opportunities for future research involvement.

4.2 A software project with a hardware target

At its core this is a software-development project: it uses a SOL-branded, modular open systems approach (MOSA) protocol to develop a product with AI support across the entire design landscape. Because the

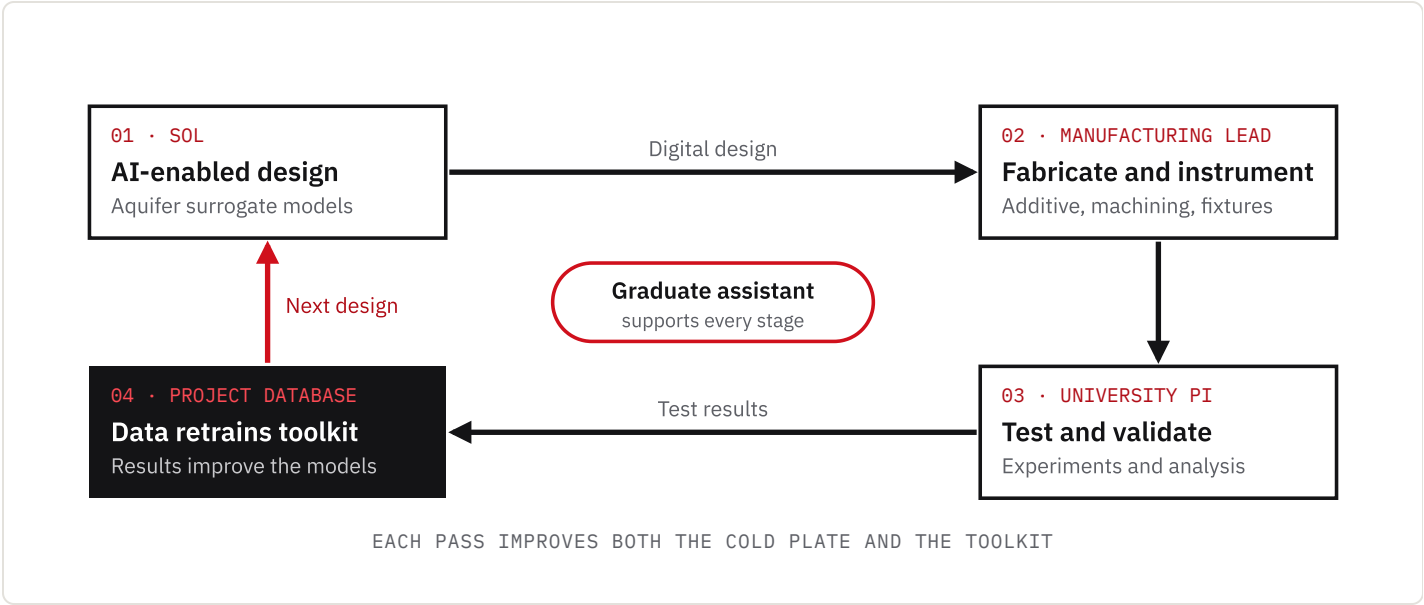
protocol is product-targeted but not product-specific, the same approach applies well beyond thermal hardware, to areas such as human resources, costing, logistics and process optimization of any kind.

Potential institution: to be identified.

5. How the Work Flows Between Partners

The roles meet in a repeating cycle (Figure 2). SOL's AI toolkit proposes a design; the manufacturing center builds and instruments it; the university tests and analyzes it; and the results go into the project database, where they retrain the surrogate models for the next, better design. Each pass through the cycle improves both the cold plate and the toolkit, and the graduate assistant supports every step.

Figure 2. The design, build and test cycle



Schematic of the iterative development cycle described in this document.

6. Related Documents

Partners considering these roles may find the following useful:

- Stakeholder guide for the university co-investigator: the decisions a university partner owns, the evidence behind them and what to ask the team for.
- Test Infrastructure, Validation, and Quality Assurance for AM Thermal Hardware: test methods and the documented test and fabrication capacity of universities in Alabama and Mississippi.

- Program, Teaming, Data Rights, and Compliance Considerations: partnering with HBCUs and minority-serving institutions, export control and fundamental research, and data rights between small businesses and universities.
- The CF-JET Project in Plain Language: the project, its key concepts and answers to common questions, for readers new to the material.
- The CF-JET research briefing: the design point, approach and evidence.