Parallax
ADVANCED RESEARCH
Advancing the Science of Intelligent Teaming™

Contact us today!

If you are an academic, industry or government entity with a desire to collaborate on science and technology innovation and research and human and business solutions, then we are here for you!

parallax@parallaxresearch.org

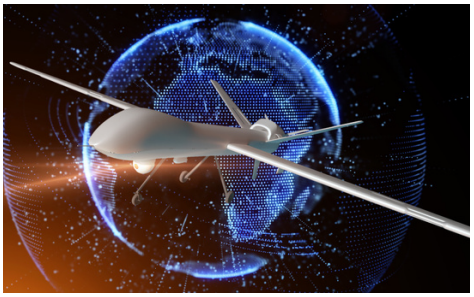
www.parallaxresearch.org

@Parallax Advanced Research

Parallax is a 501(c)(3) nonprofit that tackles global challenges by accelerating innovation and developing technology solutions through strategic partnerships with government, industry, and academia across Ohio and the Nation.

Research Development Testing & Evaluation

Parallax conducts cutting-edge research on humans and machines and how they interact and perform in the realms of artificial intelligence reasoning, complex autonomous systems and research intelligence. Our research programs enable human, artificial intelligence and autonomous or self-directed systems to work more effectively together by developing new ways for artificial intelligence to understand and respond to human goals, emotions, intent and trust. In addition, our programs improve how humans perform in highly demanding situations, how humans and machines come to agree and, then, perform when faced with multiple tasks spread over large geographies. We also develop novel approaches to managing large volumes of data to significantly increase intelligence in new global environments for our customers.



Unmanned Vehicles

Parallax's unmanned aerial vehicle (UAV) program delivers unmatched multi-UAV command and control (C2) test and evaluation capability across the globe. Our work in the evaluation of advanced control and display systems for semi-autonomous, remotely piloted aircraft is critical to the development of C2 systems that enable a single operator to control multiple UAVs.

Human Performance

At Parallax, the human performance program merges innovative principles from cognitive systems engineering, human factors and neuroscience with operational subject matter expertise to design and develop solutions for current issues and future challenges. These solutions improve the efficiency and effectiveness of human and machine systems in commercial, industrial and defense environments.

Artificial Intelligence (AI), Autonomy & Analytics

At Parallax, our AI, autonomy and analytics programs enable human, AI and autonomous system teaming. Our research advances the state of the art in AI goal reasoning, trust and understanding emotional intent; novel capabilities for distributed control for large systems in complex environments; causal and multi-perspective modeling that focuses on computational social science; and novel data science approaches to deliver strategic research intelligence.

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We are a 501(c)(3) nonprofit research institute. We solve critical challenges for the Nation's security and prosperity. We do this by focusing on creating impact by accelerating investments in the U.S. science and technology enterprise. We engage in research aimed at solving critical state- and federal-level challenges at the intersection of government, industry, and academia using the Triple Helix Model of Innovation. This model combines resources, competencies, and perspectives from different sectors (academia, industry, and the government) to drive innovation and new creative solutions; anchors and cultivates innovation ecosystems within a region; engages in boundary-spanning activities and encourages collaboration within and between these three sectors.

Scan the QR code to view helpful resources

Artificial Intelligence and Autonomy

Parallax is a leader in AI and autonomy. Our research spans this vast and growing field from modeling complex systems, including the development and application of neuromorphic algorithms to modeling human cognition and metacognition and agent reasoning algorithms.

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Human and Machine Cognition

Parallax traces much of its history to improving human performance through understanding cognitive psychology, neuroscience, human factors engineering, and cognitive systems engineering. Our work in human–AI trust and trust collaboration is extensive and growing.

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Unmanned Systems Command and Control

Parallax has and continues to develop cutting–edge command and control for various autonomous systems. Our national and international test development and execution expertise include test scenario development, airspace approval requirements, test execution, and post–demo analysis support.

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Space and Aerospace Advanced Technology

Parallax is engaged in critical areas of aerospace and space research, development, testing, and evaluation, public–private partnerships, and policy development. Our experts are involved with others to define the functional requirements for an open–standard approach to connecting current and future lower altitude surveillance systems for advanced air mobility platforms.

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Consulting Services

Parallax's Consulting Services are intended to help our clients build and sustain healthy, high–performing organizations with engaged innovative people. These services complement our company's technology and research–focused capabilities, to provide a holistic suite of solutions that enable peak performance and mission success.

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Entrepreneur and Research Networks

Parallax engages with, builds, and connects a nationwide network of high–performing teams and collaborators from academia, industry, and the government through its Ohio Federal Research Network (OFRN) and Launch Dayton programs.

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Parallax has capabilities in logic, ontology, theorem proving, natural language processing, planning and cognitive science that are relevant to the Bengal program goals. The AI and Autonomy group at Parallax takes a comprehensive approach that involves: basic and applied research in artificial intelligence and cognitive science, taking inspiration from cognition to devise new algorithms and taking inspiration from algorithms to understand cognition.

In the area of adaptive executive control we control complex systems with sophisticated knowledge representations and adaptation involving

- Complex organizational control for complex systems
- Adaptation of tasks and plans to new information
- Formulation, prioritization, and adoption of goals
- Representation and repair of internal reasoning failures
- Replanning and learning in response to surprises

We utilize complex cognitive agent-based models, simulating of interpersonal dynamics using state-of-the-art human cognition models that includes

- Discovering emergent population behaviors by simulating individual members of the community
- Simulating the interaction of geopolitical and state actors
- Modeling the complex biases, knowledge, motivations, and emotions that underlie human decisions
- Anticipating human adaptation to obstacles
- Representing minds that represent one another

We perform highly context-aware user modeling, that supports performance optimization through adaptation to individual differences, including

- Discovering and combining metrics for selecting appropriate user interventions
- Enhancing individual performance through tailored interventions
- Tracking user progress
- Detecting changes in cognitive state changes to catch potential errors
- Tailoring to individual differences in real-time

Through autonomous hypothesis generation and testing we create curious systems that develop and test theories about the world, which involve

- Making hypotheses about the unseen from sparse observations
- Combining evidence from multiple sources to separate truth and news from bias and fiction
- Learning about new environments quickly through exploration and directed testing
- Setting goals to know more about the world
- Discovering complex dynamics that allow prediction of system behavior

In the areas of logic, ontology and theorem proving, Parallax personnel have a multi-decade history of developing the worlds largest, open source, formal ontology, and employing formal theorem provers to use the ontology for reasoning in a wide variety of domains. The ontology consists of tens of thousands of concepts and many more formal statements in higher order logic, hand-crafted and curated over 23 years. The logic employed allows for detailed deductions and proofs that go beyond what is possible in knowledge graphs or less expressive logics, including reasoning about situations, beliefs, preferences and knowledge. This approach avoids the limits that less expressive logics in handling conflicting or contradictory information that is contextualized by the situation or the agent. The ontology avoids language bias, having separated linguistic data for some 25 different languages, from the formal definitions of concepts. A set of mature tools and methods takes advantage of the same economies of scale as modern programming, using large-scale reuse and tooling to increase the productivity of knowledge programmers by orders of magnitude over what was possible previously with Good Old Fashioned AI.

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