



INFORMATION SYSTEMS AND CYBER

The Information Systems and Cyber Division (ISCD) is the premier provider of current state-of-the-art and future secure information-systems expertise for the space enterprise and beyond. ISCD staff couple the latest in information system technologies, such as cloud computing, artificial intelligence, cybersecurity, and augmented/virtual reality, with modern computer and software engineering methods to deliver responsive and timely engineering products of the highest quality to a variety of customers.

Cloud Data and Software Architectures

ISCD provides support for the development of cloud-native applications and data architectures for civil and national security space systems. Focus areas include modular and scalable software architectures for cloud, on-prem, and hybrid deployments; refactoring monolith applications into modules for cloud migration; data platforms with scalable data pipelines for high volume and high velocity historical and streaming data sets; and data stores for diverse data types from structured to semi-structured data.

Machine Learning and Artificial Intelligence Research, Applied Data Science, and ML Engineering

Aerospace contributes to the development and application of data science, artificial intelligence (AI), and machine learning (ML) techniques across various space mission data domains. ISCD conducts research into AI algorithms, engineers and tests solutions for putting ML products into production, and applies existing data science tools to unique problem domains.

Space Cyber Monitoring

ISCD delivers innovative solutions on space cyber detection, leveraging AI/ML technologies to effectively detect, protect & respond to cyber threats and provides top end solutions to missions to counter adversary attacks on ground, spacecraft and communication systems. Our expertise includes threat mapping, vulnerability assessment and security testing to simulate threat vectors and improve system security for early prevention on emerging threats.

Aerospace partners with the space cyber community, providing infrastructure and expertise for cyber operations trainings and events. The annual Hack-a-Sat competition features a digital twin of an Aerospace-designed satellite. Additionally, Aerospace has introduced the Space Attack Research and Tactic Analysis (SPARTA) matrix to address the information and communication barriers that hinder the identification and sharing of space-cyber Tactic, Techniques, and Procedures (TTP). SPARTA defines and categorizes commonly identified activities that contribute to spacecraft compromises to provide unclassified information to space professionals.

Lines of Research:

- › Cybersecurity
- › Information Technology
- › Software Applications
- › Software Engineering

Example Research Areas and Projects:

- › Cyber testbeds and assessments
- › Trusted computing
- › Cloud computing
- › Big data analytics
- › Cloud native applications
- › Data platforms
- › Space warfighting architectures
- › User experience
- › Open frameworks
- › Visualization
- › Development operations + security
- › Automated space warfighting assurance
- › Validation and verification for model based engineering
- › Anomaly and threat detection
- › AI at the Edge
- › Physics Informed Machine Learning
- › Trusted and Ethical AI

System Security Engineering and Analysis

ISCD delivers systems engineering expertise during a program's entire lifecycle including pre-acquisition, acquisition, development, sustainment, and operations. We improve the consistency and repeatability of engineering approaches, methods, tools with consistent support on design for security and cyber resiliency. We provide all spectrum analysis and system security support including supply chain analysis, program protection planning, risk analysis, critical components analysis ensuring mission success at every step of the acquisition cycle.

Embedded Compute and Next-Gen Spacecraft

We provide fabrication and security testing on embedded components, modernizing hardware and payload development techniques and process. ISCD has rapidly networked and reconfigured spacecraft design to stay ahead of threats.

Crypto Architecture and Engineering

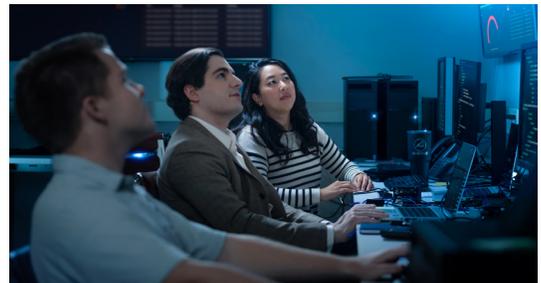
To ensure secured communications, we provide support in crypto development, crypto performance, and architecture engineering. Aerospace assists in NSA Coordination and Key Management planning to meet mission crypto needs.

Software Engineering

Aerospace supports the development of software applications leveraging agile and DevOps solutions, increasing development velocity by adding innovative functionalities and new versions to our existing and new product lines and offerings and updating existing platforms. The team leverages modern tools and methodologies, scalable frameworks, and workflows.

Additional Software Engineering capabilities include:

- Software Acquisition Strategy and Analysis
- Organizational Operations Modeling and Simulation
- Software Tools and Prototyping
- Software Lifecycle, Modeling, and Integration
- Space Systems Software Architecture
- Software Development Processes, Best Practices, and Standards



The Aerospace Corporation

The Aerospace Corporation is a national nonprofit corporation that operates a federally funded research and development center and has more than 4,500 employees. With major locations in El Segundo, California; Albuquerque, New Mexico; Colorado Springs, Colorado; and the Washington, D.C. region, Aerospace addresses complex problems across the space enterprise and other areas of national and international significance through agility, innovation, and objective technical leadership. For more information, visit www.aerospace.org.