



Full Lifecycle Development, Evaluation and Support of Counter-UAS Systems

SPA Integrated Capability Overview

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STRATEGIC IMPORTANCE OF COUNTERING UNMANNED AIRCRAFT SYSTEMS

Countering Unmanned Aircraft Systems (CUAS) is a national strategic imperative as unmanned platforms proliferate across the globe in both benign and contested environments. The acquisition of the right CUAS capability to protect a particular infrastructure requires more than buying from a catalogue of CUAS systems. Effective CUAS solutions demand more than advanced technology; they require a systems approach with thoughtful analysis supported by rigorous systems engineering, program management, modeling, test execution, data evaluation, vulnerability analysis, operational solution integration and support.

Systems Planning & Analysis along with Red Six, an SPA Company, offers a streamlined, comprehensive, and vertically integrated capability stack. SPA's methods can identify a capable system that can be implemented in just a few months.

- Threat and vulnerability assessment
- Requirements development and management
- Policy development
- DOTMLPF-P analysis
- System design and architecture
- Digital twin modeling
- Live flight testing
- Mission wargaming
- Program management
- System engineering support

This end-to-end solution enables the U.S. Department of Defense, Homeland Security, and critical infrastructure clients to develop, assess, and evolve CUAS capabilities with unprecedented precision, agility, and cost-effectiveness.

SPA DIGITAL SYSTEMS ENGINEERING LIFE CYCLE – SPIDER & SWARMINSIGHT

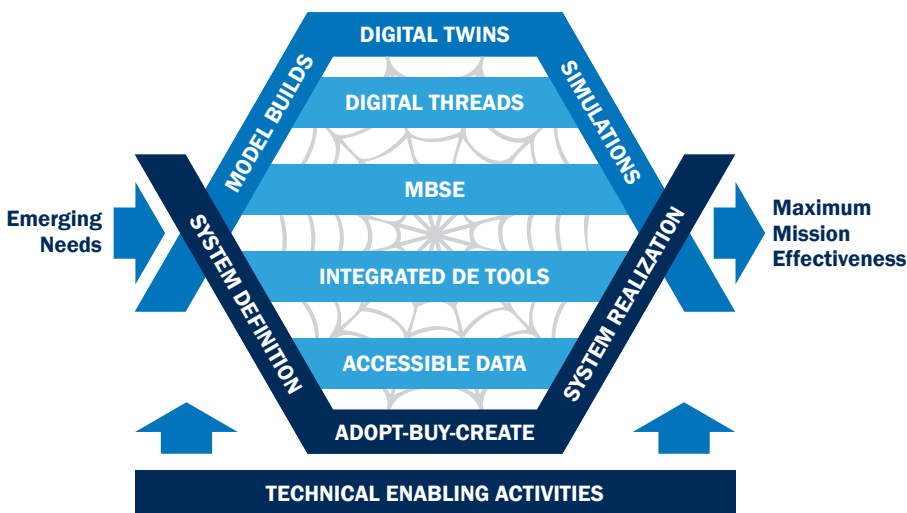


Figure 1: SPIDER

The organizing framework for this end-to-end solution is SPA's Systematic, Proactive, Integrated Digital Engineering Resource (SPIDER), shown in Figure 1. SPIDER reimagines the traditional Vee model by integrating a fully digital, data-driven framework that removes stovepipes and fosters real-time collaboration across all phases of the engineering life cycle.

Through SPIDER, SPA delivers a holistic, model-based approach that enables early problem identification, agile decision-making, virtual testing, and cyber-resilient system design—accelerating timelines,

improving quality, and reducing programmatic risk and rework. In addition to enhancing sustainment planning and readiness with predictive tools, this adaptable, interoperable ecosystem empowers clients to defend budgets and mission outcomes with data-backed decisions and digital demonstrations traced back to system architectures and requirements.

SwarmInsight (Figure 2) is our flagship platform for evaluating CUAS systems in a digital systems engineering environment, encompassing and complementing all aspects of the “Systems Engineering Vee” offering full program office support.

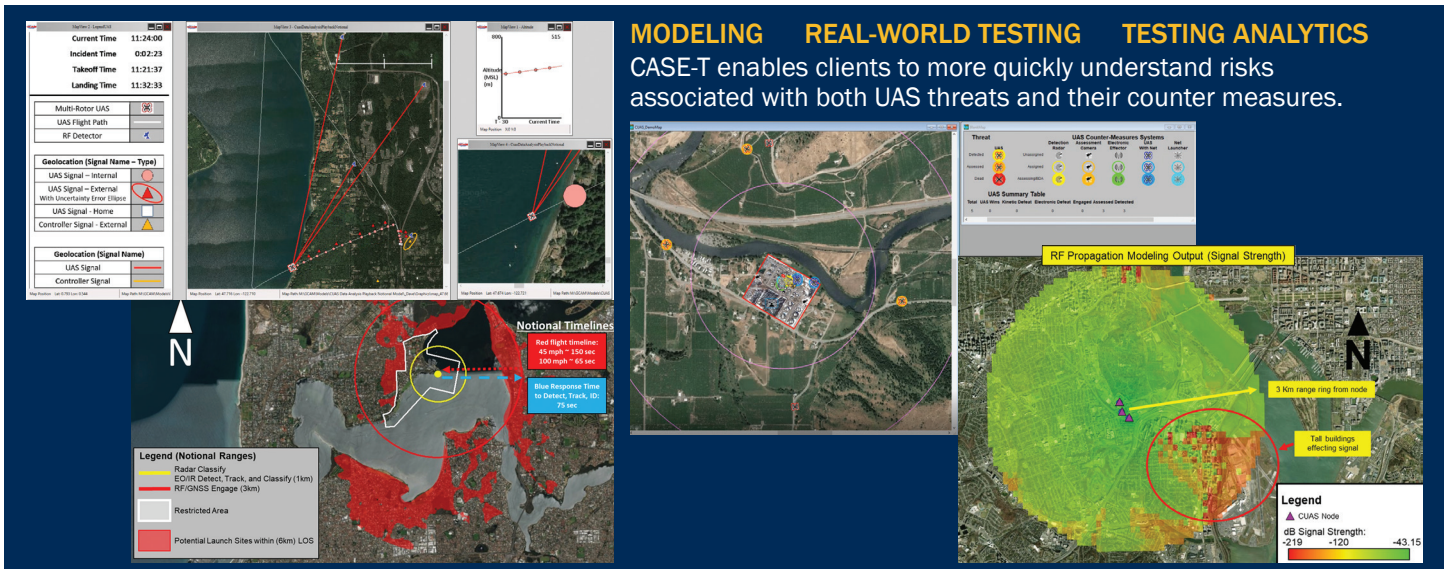


Figure 2: SwarmInsight encompasses all aspects of the “Systems Engineering Vee,” offering full program office support.

Figure 3 shows where SwarmInsight and other SPA digital tools fit into the system Engineering SPIDER Vee, enabling SPA to deliver CUAS system full life cycle system engineering and program management support.

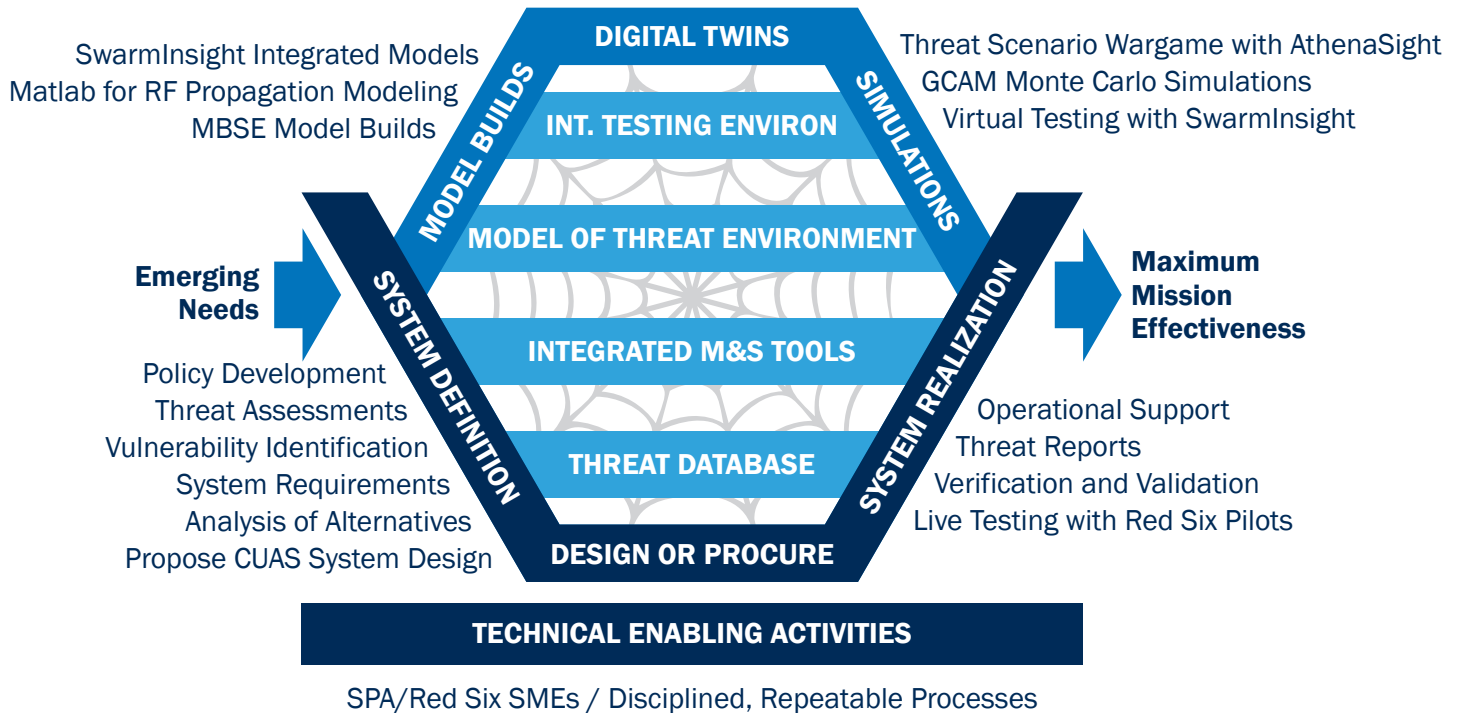
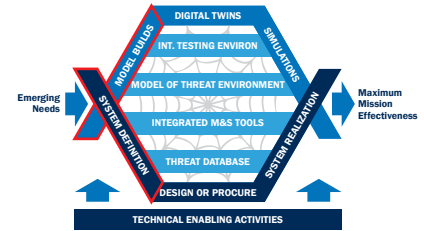


Figure 3: SPA digital tools deliver CUAS System Full Life Cycle System Engineering Support

COMPREHENSIVE UAS THREAT ANALYSIS AND CAPABILITY REQUIREMENTS

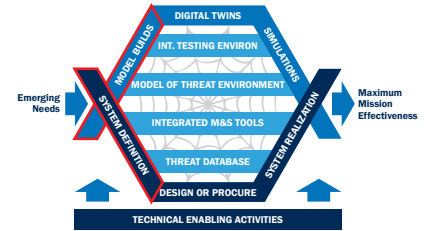
Building on the strategic importance of CUAS solutions outlined above, SPA develops UAS threat scenarios featuring the most up-to-date UAS capabilities, informed by open source and classified intelligence, to identify vulnerabilities and reveal required capabilities through mission planning. SPA's robust assessment expertise supports decisions across the DOTMLPF-P spectrum and resolves critical issues. Current efforts include:

- Conducting Capability-Based Assessments (Navy Nuclear Weapon Security and Navy Afloat missions)
- Drafting requirements using specific acquisition frameworks
- Coordinating and drafting authorities, doctrine, and policy with interagency partners to close capability gaps in specific operational environments
- Developing digital twins and models of areas, facilities and assets to be protected from UAS
- Producing monthly UAS Threats Report with expert analysis of open-source UAS events around the world



EVALUATING AND SELECTING OPTIMAL CUAS SOLUTIONS

In addition to assessing threats, SPA combines extensive CUAS system knowledge with deep analytical expertise to assess which capabilities are needed to protect against current, emerging, and future UAS threats. Recognizing the need for a layered defense, we understand the importance of combining varied capabilities within a system of systems, all integrated into an architecture that is tactically and operationally practical.



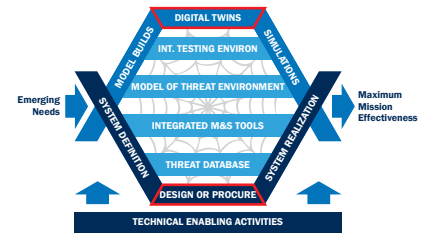
SPA continuously monitors and evaluates CUAS technologies:

- SPA, through our operational and analytic experts, attends CUAS research development events as a trusted agent and routinely evaluates new technologies since 2017.
- Red Six pilots fly against CUAS systems around the world and at national-level test and demonstration events.

SPA plans and executes Analysis of Alternatives (AoA), including thorough tailored evaluation methodologies, to identify required capabilities and assess how numerous CUAS systems address them. We evaluate thousands of engagement simulations via our GCAM® software tool, which incorporates threat and CUAS system capabilities from the AoA, to understand each CUAS system. Results provide a statistically significant assessment of system performance that is combined with qualitative subject matter expertise to deliver data-driven recommendations on robust CUAS solutions for acquisition and deployment. Our system-of-systems approach ensures overlapping coverage that addresses the full threat spectrum are incorporated within a structure that allows operators to make informed decisions.

EFFECTIVE DEPLOYMENT OF CUAS IN COMPLEX ENVIRONMENTS

SPA routinely supports the rapid deployment of CUAS systems in complex operational environments throughout the United States and for clients overseas. SPA conducts comprehensive system safety assessments, executes system functional testing and verification, and collects required data, policy, and concepts of operation to provide required evidence to deploy CUAS systems within the United States.



AthenaSight is our user-driven, tablet-enabled wargaming and mission-planning environment. AthenaSight, a Unity-based simulation and decision support tool (shown in Figure 4), allows stakeholders to depict complex multi-domain engagements in real time or turn-based formats, helping refine CONOPs, force structure, and tactics, techniques, and procedures.



Figure 4: AthenaSight, SPA's wargaming and mission planning environment, enables stakeholders to depict complex multi-domain engagements in real time or turn-based formats

→ Highlights from SPA's Support for CUAS Operational Evaluations:

Lead for planning, execution, and post-test data analysis for the annual United States Secret Service CUAS test and evaluation event in the National Capital Region.

Lead for planning, execution, and post-test data analysis for the semi-annual CUAS test and evaluation events as part of the Navy Nuclear Weapons Program

Test and evaluation support (observer and data analysis) to high-visibility Department of Defense test and evaluation events of operational CUAS systems, including Joint Integrated Air and Missile Defense Office (JIAMDO) Exercise BLACK DART, Physical Security Engineering and Analysis Group (PSEAG) CUAS Capabilities Working Group, Joint Staff J6 Joint Assessment Division (JAD), and Counter-uncrewed Experimentation and Advanced Development (CEAD) events.

Army and Air Force IAMD Programs: Red Six live-flight UAS platforms simulate next-generation threats for integrated air and missile defense testing for Joint Army Joint Counter-Small UAS Office (JCO), USMC, Navy, Defense Innovation Unit, Strategic Capabilities Office (SCO).



THOROUGH T&E AND V&V SUPPORT FOR CUAS

To assess existing CUAS capabilities against current threats or evaluate the performance of an acquired CUAS system against specifications, SPA plans and facilitates large-scale, high-visibility, live-flight test and evaluation events with SPA-provided drones and pilots that replicate the client-determined drone threat and tactics. SPA's full-spectrum capabilities for operational evaluations include interagency coordination for spectrum and airspace approvals, full test plan development with launch locations and flight sorties tailored to client needs, and comprehensive safety assessments with considerations for HERO/HERP/HERF along with infrastructure and personnel safety. SPA's unique capability quantifies CUAS system performance through proprietary, purpose-built data analytic tools.

Using embedded test ranges and custom/proprietary UAS platforms, Red Six's world-class, FAA-certified drone pilots execute realistic threat emulation across the Group 1–3 UAS classes with a single drone or swarm of drones. Our live flight services provide high-fidelity test data on detection, tracking, classification, and defeat—capturing operational edge cases that feed directly into our analytic models.

Live-Test Integration brings in-flight data into simulation environments to assess performance against all threat cases, including peer and near-peer adversaries.

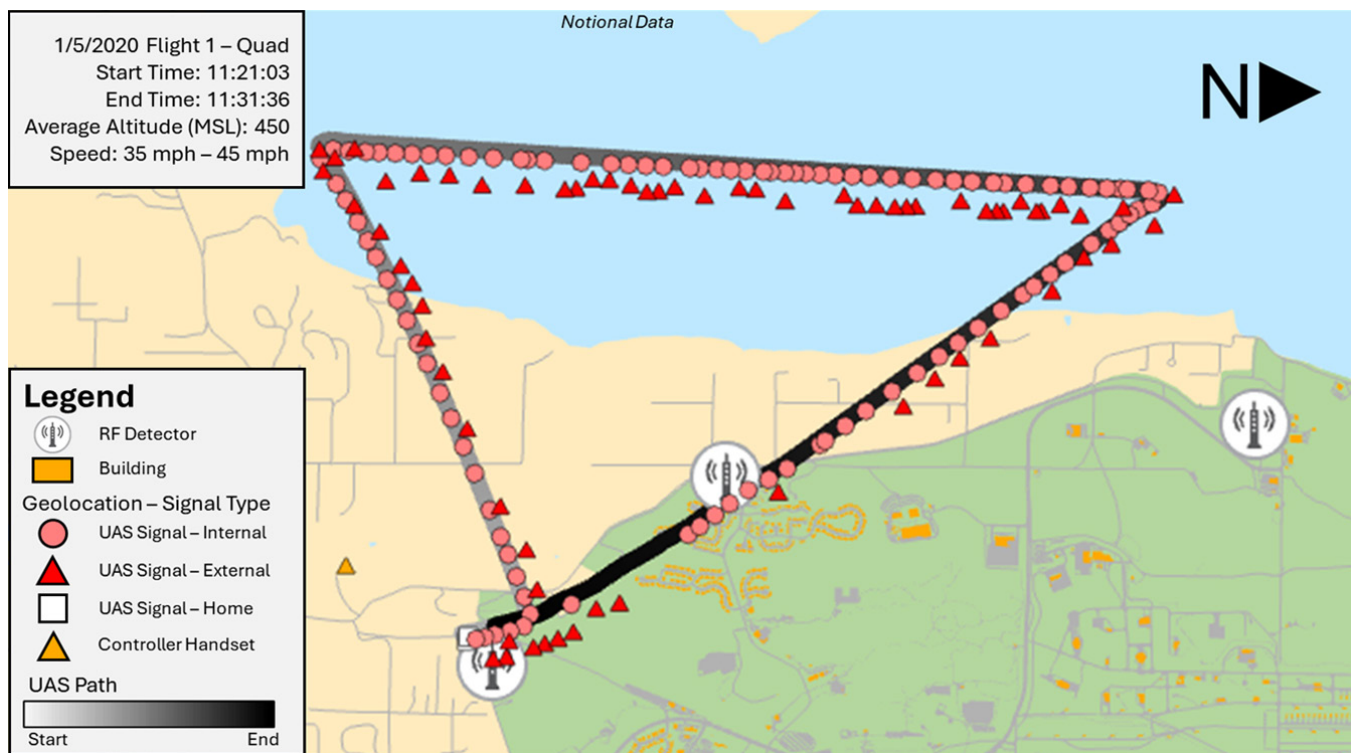


Figure 5: Notional example incorporating UAS and CUAS system data into SPA's modeling and simulation environment to understand overall system performance.

PRACTICAL APPLICATIONS AND CASE STUDIES

- **Navy Nuclear Weapons Security:** SPA's AthenaSight wargaming and mission-planning environment aids command-level mission planning.
- **Joint Operational Test and Evaluation:** Model-based engineering and SwarmInsight analytics were used to conduct performance assessments of fielded CUAS systems across combatant commands.
- **Sea-Air-Space 2025:** Public demonstrations showcased our MBME tools, SwarmInsight analytics, and live-flight data fusion capabilities

ONGOING OPERATIONAL SUPPORT FOR CUAS TECHNOLOGIES

SwarmInsight continues with deployed system support for emerging threat and enemy TTP evaluation, vulnerability analysis of those threats, and live performance testing of installed CUAS systems with target drones customized to emulate the new threats.

Furthermore, AthenaSight wargaming and mission-planning environment enables operational users to rehearse missions, refine CONOPs, and develop new TTPs with the same models used during system evaluation.

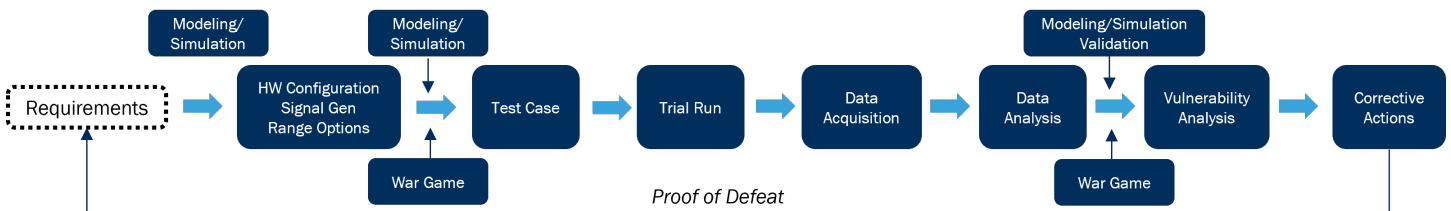
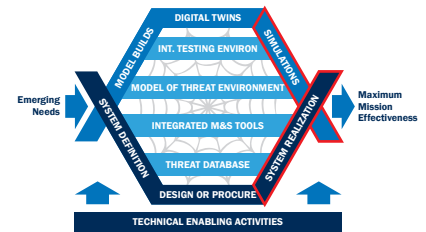


Figure 6: SwarmInsight delivers a closed-loop, data-driven environment where concept design, testing, training, and sustainment feed into one another and back to the beginning of the “Systems Engineering Vee” —eliminating stovepipes and accelerating capability maturation.

STRATEGIC ADVANTAGES OF SWARMINSGHT

The SwarmInsight and SPIDER integrated approach enables:

- **Accelerated Development:** Tight feedback loops between government personnel, modelers, testers, and analysts shorten development timelines.
- **Informed Decision-Making:** Data-driven insights support milestone decisions from concept refinement through fielding.
- **High-Fidelity Realism:** Live data ensures simulation credibility while uncovering emergent behaviors.
- **Readiness Optimization:** Forecasting tools align operational needs with logistical and fiscal realities.
- **Collaborative Training:** Distributed wargaming capabilities allow joint and coalition teams to rehearse together using validated scenarios.

SPA: A TRUSTED AGENT

SPA is a trusted agent for the U.S. government. This position rises from SPA's unmatched combination of subject matter expertise in UAS threat detection, deterrence, and CUAS system performance, along with an understanding of how different types of CUAS sensors perform in specific operational environments, allows decision makers to select the right CUAS technologies for the right location, supported by the right operational techniques.

ENSURING READINESS AND ADAPTABILITY FOR FUTURE THREATS

The SPA SPIDER framework, coupled with SPA's SwarmInsight tool, enables the full spectrum of CUAS life cycle support by combining model-based engineering, live operational testing, mission rehearsal, program management, and systems engineering disciplines under one delivery source—all executed within SPA's digital ecosystem.

As adversary UAS capabilities evolve—flying faster, higher, and more autonomously—our integrated team ensures clients remain ahead of the threat through:

- Better system acquisition decisions
- Faster time to field
- Superior mission rehearsal and training
- Greater operational readiness and resilience

Whether supporting the Pentagon, homeland security partners, or mission-focused operators, SPA stands as the leading provider of full life cycle CUAS solutions.

RECOGNIZED EXCELLENCE: CUSTOMER TESTIMONIALS

Strategic Systems Programs N0003020C0037 CPARS for 03/31/2024 - 02/15/2025:

“[SPA] consistently demonstrates an exceptional ability to flawlessly execute end-to-end Counter-Unmanned Aircraft System (C-UAS) Test and Evaluation (T&E). This includes test planning, coordination with Department of Defense (DoD) and interagency stakeholders (including the Navy-Marine Corps Spectrum Center and the Joint Navigation Warfare Center), safe conduct of licensed onsite UAS flights in accordance with federal, state, and local regulations, and performance of post-test data analysis to quantify C-UAS system performance. Their analytic skills display an ability to perform comparative analysis of disparate data sets and visually depict results in a 3D geographic environment that promotes ease of stakeholder decision-making in a clear, concise, and transparent manner. Their capability and integrity has earned their role as a trusted agent.”

Strategic Systems Programs N0003020C0037 CPARS for 03/31/2024 - 02/15/2025:

“[SPA] is entrusted to support government System Operational Verification Tests (SOVT) of C-UAS system software and represent the client as stakeholders in gathering data during DoD sponsored C-UAS T&E events. The Contractor was responsible for developing Flight Test Plan documents for C-UAS performance testing at both Navy Strategic Weapons Facilities (SWF) and conducting functional testing and verification after software upgrades. They also facilitated an Ashore C-UAS AoA down-selection that supported a final stakeholder decision.”



Systems Planning & Analysis, a leading global provider of data-driven analytical insights supporting national security objectives, provides deep domain expertise, problem-solving capabilities, and a results-driven approach to program lifecycles, reaching a wide spectrum of market areas.

With over 50 years of experience, SPA's portfolio of differentiated capabilities and tools delivers comprehensive support to the most critical programs for combating threats, influencing long-term strategic priorities, and shaping policies at the highest levels.

OUR FOCUS

DEFENSE

SEA

LAND

INTELLIGENCE

AIR

HOMELAND SECURITY

SPACE

CYBER



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Full Lifecycle Development, Evaluation
and Support of Counter-UAS Systems



OBJECTIVE | RESPONSIVE | TRUSTED

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