AEROSPACE

An Aerospace team models potential threat scenarios at the Los Angeles Coliseum

COUNTER-DRONE MODELING, SIMULATION, AND ANALYSIS

The Problem with Drones

Rapid and continuous improvements in technology are not only increasing the availability and utility of unmanned aerial systems (UAS), but are enabling heavier payloads, lowering manufacturing costs, and increasing ease of operation for users. However, these factors have also increased the potential for nefarious use of UAS by hostile actors exponentially. The threat of UAS to American interests both within the continental U.S. and outside our borders is an ongoing concern that has prompted research into the development and integration of technologies for countermeasures, or Counter-UAS (CUAS) techniques.

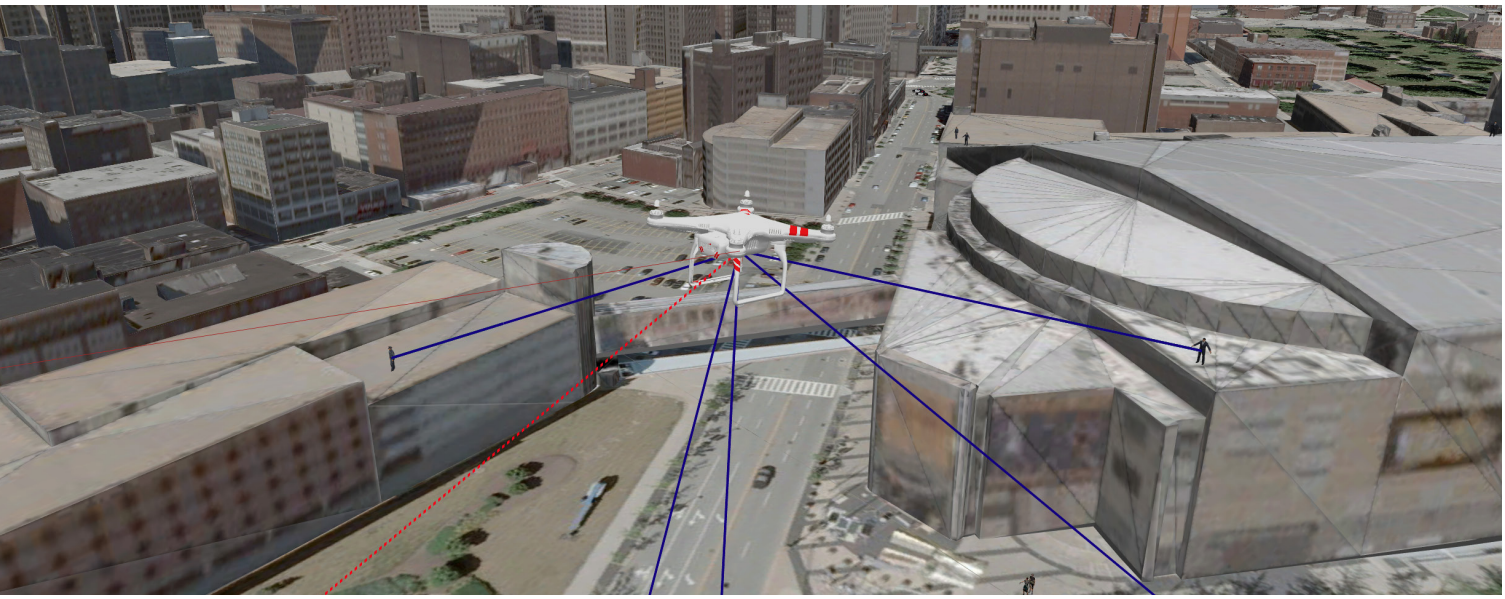
The Aerospace Corporation provides objective, mission-critical support of CUAS applications by way of modeling, simulation, and analysis (MS&A), testing and evaluation, threat assessments, and other data-driven analytics capabilities. Using decades of MS&A, sensor, and phenomenology expertise, Aerospace provides comprehensive technical and programmatic support for the acquisition, deployment, and operations of CUAS technologies to secure events, venues, high-value assets, or other infrastructure.

Modeling, Simulation, and Analysis Features

Leveraging the breadth and depth of its MS&A capabilities in its site assessments, Aerospace strategically selects CUAS sensor locations to provide the optimal sensor coverage required to mitigate launch site vulnerabilities and liabilities. Our MS&A techniques employ cutting-edge geospatial modeling to determine line of sight for potential threats and visualize the surrounding areas of interest. This 3D visualization is supplemented by 2D sensor coverage charts, with overhead and panoramic views furnished by sensors located at multiple viewpoints. Visualization has proven to be a valuable tool for operations planning, training, realtime operations, and post-event forensics.

CUAS Modeling, Simulation and Analysis capabilities

- Strategic sensor placement to minimize potential vulnerabilities
- Geospatial modeling to determine line of sight
- High-resolution geospatial modeling for any event, venue, or other infrastructure of interest
- End-to-end modeling of potential threat and mitigation scenarios
- UAS fleet for accurate data gathering
- Extensive laboratory resources for modeling and testing



Applying Technical Excellence in the CUAS Domain

STOCHASTIC MODELING

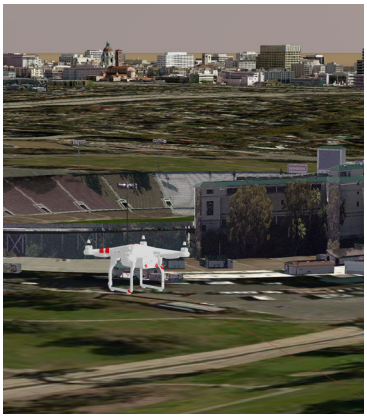
Stochastic modeling estimates probability distributions when one or more variables behave randomly over time. Aerospace can leverage our stochastic simulation capabilities to replicate end-to-end incursions, including mitigation, and quantify the probability of detection and other sensor performance parameters. This can be replicated to test the strengths and weaknesses of different CUAS technologies and integrations and the resultant impact on mission effectiveness.

3D MAPPING AND MODELING

High-resolution geospatial modeling is integral to MS&A for CUAS applications, which incorporates elevation data—such as terrain, vegetation, and buildings—as well as 3D building models and satellite imagery from government and private sector sources. If available data is of insufficient resolution, Aerospace can assign its own fleet of UASs to survey the site and generate a virtual representation of the environment using photogrammetry and other techniques.

LABORATORY-QUALITY SENSORS

Using in-house, laboratory-quality sensors, Aerospace can measure UAS signatures and assess the capabilities of CUAS sensors for modeling purposes. Scientific electro-optical and infrared (EO/IR) sensors, for example, enable the measurement of UAS temperatures against a variety of backgrounds, establishing IR sensor requirements and understanding the impact of clutter in UAS detection and identification.



Virtual environment in Aerospace MS&A tools.

The Aerospace Corporation

Aerospace is a nonprofit corporation that operates a federally funded research and development center (FFRDC) for the United States Air Force. This FFRDC spans the entire space domain for government as well as civil space and other federal agencies. With a world-class workforce of roughly 3,000 engineers and scientists, Aerospace is able to respond with agility to the unique challenges posed by national security space requirements, delivering well-defined, innovative solutions that assure mission success.

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