

UAS Simulation, Design & Analysis Services



Simulation & Training

- Train UAS operators, payload specialists and observers
- Develop high-fidelity flight models
- Assess flying qualities
- Develop and demonstrate control laws and auto-pilot functions
- Evaluate mission capabilities and hardware

Prototype Design

- Sub-scale and full-scale UASs
- Novel and complex configurations
- Light-weight, composite airframes
- Highly skilled, award-winning model builders
- State-of-the-art tools, technologies and processes
- Integration of system components

Flight Dynamics Analysis

- Quantify powerplant effects on aerodynamic characteristics
- Identify stability & control issues
- Assess structural integrity
- Quantify precise vehicle performance
- Provide source data for high-fidelity flight simulation database

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Modeling & Simulation Software Tools & Services

Leveraging its extensive experience in fixed-wing and rotary-wing aircraft math model development and advanced simulation software tools developed for the aerospace industry, BAR provides simulation solutions for UAS operator and crew training, flight plan evaluation and flight rehearsal. We work with customers to match the simulator capabilities to your specific training needs, including flight-representative vehicle dynamics, failure and malfunction modeling, environmental modeling, customized visual scenery, helmet mounted display integration, or advanced instructor station displays.



Full-Scale and Sub-Scale Prototype Fabrication

Drawing upon its pioneering efforts in wind tunnel model construction for dynamic testing, BAR specializes in the construction of high-strength, lightweight airframes for UAS applications. BAR's model specialists apply their unique skills during the entire fabrication process including CAD drawing review, CNC milling, material lay-ups, internal structure design and fabrication, component integration, and final finishing. These skills have resulted in models recognized by BAR's customers as well as models that have won international model building and flying competitions.



Flight Dynamics & Structural Analyses

An essential part of any UAS development program is the assessment of the vehicle's ability to meet the mission requirements. BAR provides the expertise to assess the flight characteristics of the UAS over the full operational flight envelope and determine its suitability for the proposed flight task. Whether the outcome of an assessment verifies the viability of the design or produces recommendations for design changes, a flight dynamics assessment is a critical step in assuring the success of your UAS program. BAR also retains the tools and expertise to effectively conduct a structural assessment of the air vehicle. BAR calculates the stresses on the vehicle as a function of air loads provided by the customer or predicted by BAR's software tools, taking into account the structural design, material properties, and required safety factors.



UAS Consulting

One of the challenges associated with UAS development is acquiring the airworthiness certificate that is necessary for UAS flight testing and operation. BAR's first-hand experience with UAS development programs and its established relationships with industry, the FAA, U.S. Air Force, and U.S. Navy are leveraged to help customers navigate the complex waters of airworthiness certification. BAR will provide insight into the types of concerns and issues that are raised during technical and safety review boards, and offer the analytical services necessary to qualify your configuration. BAR's success in this area is demonstrated by the certification of novel aircraft configurations to the latest and most stringent Air Force airworthiness certification requirements for unmanned systems.