

Advancing Aviation

Avansys Capabilities Statement

Company Overview

Avansys is at the forefront of **emerging aviation concepts**. We support our customers in planning for the introduction of **new vehicle types** to the national airspace, directly contributing to the most significant transformation since commercial aviation's advent. Our solutions bring **conceptual clarity** and credibility to some of the most complex challenges facing the airspace of the future.

Our Unique Approach (aka Differentiators)

Our approach is tailored to problem statements that are too ambiguous to allow the direct application of traditional subject matter expertise. We uniquely combine **disruptive ideation techniques** with **curated knowledge structuring** methods to simplify open ended inquiries to a degree suitable for application of "commoditized" aviation and technology acumen.

Simply put, ***we organize and architect the problem space*** so that experts are able to chime in.

Examples of ideation techniques we have found to be effective are:

- **Idealized design** – work backward from ideal state to identify constraints
- **Falsifiable hypotheses** as a basis for creative insights – "what would have to be true for X to happen"?
- **Integrative thinking** – refusing to settle for apparent contradictions

Knowledge structuring techniques we have found to be effective are:

- **Contextualizing technology** in terms of its applications
- Apply **categorization theory notions** to remove knowledge overlaps and map knowledge hierarchies
- Interrogation aimed at **extracting general insights** from point examples provided by subject experts

Our expertise (aka Core Competencies)

We have refined the **highly specialized expertise** required to engage “**no precedent**” **problems**. In this type of working environment, templates, blueprints and best practices

cease to be relevant. Each approach is unique, and each challenge presents a real opportunity for failure. We are comfortable in assuming significant reputational risk to successfully deliver on our ability to produce results in just such environments. We have done so by intersecting skills from **knowledge management**, **research and development**, cutting edge **technology** and **aviation**.

Specifically for the FAA, we have built a successful track record in reasoning through operational implications and challenges deriving from emerging technology as the catalyst for novel flight modes.

Our Solution Portfolio (aka Capabilities)

Our *Advancing Aviation* solution portfolio is best showcased through artifacts we develop:

- Frameworks for Emerging Technology Policy
- Implementation Roadmaps for Advanced Concepts
- Cross-Disciplinary Engineering Studies

Frameworks

As emerging technology is poised to re-shape the national airspace, there is a pressing need for reviewing policy implications and updating as required. One such example is the responsible use of **Artificial Intelligence** technology in what is a highly regulated, safety-critical environment – aviation. **Agentic automation**, based on artificial intelligence, is the key enabler for new modes of air transportation such as **autonomous drones**. While responsible use of AI and agentic automation has been somewhat addressed by industry in market sectors such as social media, aviation and the national airspace suffer from a lack of clarity on this topic. Avansys has successfully designed a preliminary framework for driving **responsible use of AI** policy.

Roadmaps

Avansys is a key contributor to FAA's ongoing work on development of a roadmap for integrating **autonomous flight** into the national airspace (**Autonomy Roadmap**). This work has multiple levels of complexity. We helped address the most critical aspect, solving a

stale-mate assumption that “levels of autonomy” definitions are required to build a progression to “full autonomy”. Our conceptual break-through pivoted the autonomy progression dependency away from abstract definitions and to operational outcomes that all stakeholders can agree on. This provided a break-through that further enabled gaps to be derived from incremental operational outcomes, providing a solid basis for a comprehensive plan for autonomous flight integration at scale.

We have also built the autonomy research roadmap for NASA, defining autonomy “epochs” which continue to be relevant more than a decade after their introduction.

Studies

The **National Airspace System** is facing major transformation. New vehicle types, new propulsion modes and increases in traffic demand driven by autonomous operations, will all converge to reshape commercial aviation as we know it today.

The FAA has defined the long-term future of the national airspace as **information-centric**. This boils down to **digital technology** and **connected aircraft concepts** to aid in both the design and operation of the future airspace. Avansys is intimately involved with efforts to add **engineering rigor** to plans for the development of **Digital Twins**, development and flight demonstration of flight management system (FMS) **Digital Twins**, and cybersecurity analysis of connected aircraft concepts. These are but a few examples of the Avansys team’s deep experience enabling the American evolution to a much more complex, connected, and automated airspace.