

Second Transformative Vertical Flight Workshop Is a Great Success



By Mike Dudley, Mike Duffy and Mike Hirschberg

What if you could cut your daily commute time from 35 minutes to 12 minutes? How much of a bigger home would you buy if you could commute 100 miles to work and still get there in less than 35 minutes? What if this type of capability was cost-competitive to driving, taking the train or bus?

These questions have compelled a group of scientists, engineers and visionaries in industry, government and academia to meet once a year to tackle the technical, regulatory and perception challenges of democratized vertical flight. Technology advances in motors, batteries and automation have made the dream closer to a reality. However, the challenges are much more than just technical; therefore, a consensus amongst stakeholders is needed to increase success.

On August 3-4, 2015, a workshop was held at the NASA Ames Research Center, located at the Moffett Federal Airfield in California, to explore the aviation community's interest in Transformative Vertical Flight (TVF) Concepts. The workshop was sponsored by AHS International, the American Institute of Aeronautics and Astronautics (AIAA), and the National Aeronautics and Space Administration (NASA); it was hosted by

the NASA Aeronautics Research Institute (NARI). This second-annual workshop built on the success and enthusiasm generated by the first TVF Workshop held in the Washington, DC, area in August 2014.

Again this year, the workshop had a "sell-out" crowd of more than 130 enthusiastic registrants. Attendees had the chance to tour some of the exciting facilities at NASA Ames: the National Full-Scale Aerodynamics Complex (NFAC), the Vertical Motion Simulator (VMS), and the Hyperwall supercomputer-driven visualization system. Participants were also able to take a tour of the Hiller Aviation Museum and engage in some thought-provoking discussions at the local AHS San Francisco Bay Area Chapter dinner meeting, which featured Boeing's Dan Newman, who provided his ideas about "Our Kids' Vertical Flight."

Some two dozen presentations and panel discussions were given by engineers, scientists and visionaries from NASA and other government agencies, electric propulsion and energy storage researchers and developers, small innovators and startups, and large aerospace companies. Plans are now being made for a third workshop to be held next summer or fall.

Realizing a Transformation

The previous workshop identified the existence of a multi-disciplined community interested in this topic and established a consensus among the participants that opportunities to establish further collaborations in this area were warranted. A direct outcome of the first workshop was the resolution to conduct a series of workshops — augmented by online virtual technical seminars — to strengthen the TVF community and to continue planning for advocacy and collaboration.

The second workshop organizers focused on four desired action-oriented outcomes. The first was to establish and document common stakeholder needs and areas of potential collaborations. This includes advocacy strategies to encourage the future success of unconventional Vertiport-capable flight concept solutions that are enabled by emerging technologies. The second was to assemble a community that can collaborate on new conceptual design and analysis tools to permit novel configuration paths with far greater multi-disciplinary coupling (i.e. aero-propulsive control) to be investigated. The third was to establish a community



Left-to-right, top-to-bottom: NASA GL-10, Terrafugia TF-X, Diamond hybrid-electric tiltrotor, e-volo VC200, XTI Trifan 600, Aurora LightningStrike, Flike, Hover-Bike and Joby S2.

to develop and deploy regulatory guidelines. This community would have the potential to initiate formation of a subcommittee — to ASTM International Committee F44 on general aviation aircraft — for the development of consensus-based certification standards for general aviation-scale Vertiport-capable flight systems. These standards need to accommodate novel fixed-wing concepts that don't fit within the existing Federal Aviation Administration (FAA) rotorcraft certification framework (Part 27). The fourth desired outcome was to launch an information campaign to ensure key US government agencies understand the potential benefits — and industry interest in establishing — new Vertiport-capable flight markets.

The primary objectives of the workshop were to inform participants from industry, academia and government agencies about recent developments in Vertiport-capable flight configuration designs, operational concepts, technology, market opportunities and regulatory environments. A secondary objective was to engage the group in developing inputs for a preliminary roadmap

that will aid in the advocacy and pursuit of emerging technologies and approaches that can potentially transform air transportation; for example, electric/hybrid power and distributed propulsion. As conventional analytical tools cannot model these new configuration types adequately, they will require new conceptual design tools. They also do not inherently fit into the existing FAA certification frameworks, and regulations able to capture the fundamental differences in approach will need to be developed.

This workshop brought together interested parties with the diverse backgrounds and experience necessary to establish an intellectual framework that can serve as a foundation for a preliminary roadmap. Roadmaps are useful tools for guiding investment strategies to fill the gaps necessary to achieve successful new aviation products, and this workshop is taking a step toward making this type of tool available for Transformative Vertical Flight systems. Roadmapping activities were begun for missions/operational concepts, technical challenges and the regulatory framework.

Resources

More information can be found on the AHS website: www.vtol.org/transformative.

Featured is a description of the 2015 workshop, as well as the briefings and video recordings from the webcast. (The slides from the 2014 workshop are also available.) A draft of the proceedings has been posted and a draft of the working roadmap will be published around December 1, 2015.

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