



## Call for Papers – Autonomy-Enabled VTOL Aircraft

**Overview:** The 21<sup>st</sup> century has seen a continued emphasis on Autonomy-Enabled VTOL aircraft, and greater autonomy and automation for both military and civilian applications. Autonomy-enabled vertical take-off and landing (VTOL) aircraft are in varying stages of development all over the world, and continue to expand into the civil and military sectors for a variety of uses. Autonomy is being used to assist and enable versions of manned helicopters for dull, dirty and dangerous military cargo missions by either reducing workload, allowing for reduction in the number of required operators, and with the eventual goal of removing the human from the decision making process. In addition, the operator-interface and human factors can be one of the most significant contributions to safety and successful operations. Correspondingly, technologies and regulation are being developed to safely operate autonomy-enabled VTOL, and integrate them into commercial and military airspace.

Meanwhile, automation and various levels of autonomy are being used in modern civil helicopter cockpits, while the military's Future Vertical Lift (FVL) aircraft will need to be optionally-manned or optimally-manned. Autonomy is also a key enabler for new classes of vehicles for civil missions — such as personal air vehicles, urban air mobility and air taxi missions — using electric or hybrid-electric propulsion (eVTOL).

This biennial meeting is an excellent opportunity to learn about and discuss with academic, industry, and military engineers from around the world the latest advancements in manned/unmanned and civil/military autonomous VTOL aircraft technology.

**Invitation:** Papers are invited in the areas of autonomy-enabled VTOL Aircraft Systems vehicle and control station design. This includes civilian and military platforms of all sizes, ranging from micro vehicles (MAVs) through full-scale manned aircraft and the full range autonomy and associated enabling technologies, including fully autonomous, ground-controlled, and optionally manned vehicles. Papers addressing all aspects of operator interface design, including both the air vehicle and operator control stations are also invited. Topics of interest include but are not limited to:

- **Vehicle design**, including configuration design, gust stability and response, fault tolerant control systems, low Reynolds number aerodynamics (applicable to micro and organic air vehicles), active flow control (development of hingeless aerodynamic surfaces), self-repairing structures, as well as simulation and testing of vehicle design. Weight classes cover Micro-Aerial Vehicles (MAV), small and large Unmanned Airborne Systems (UAS), man-rated on-demand eVTOL, and multiple-passenger or troop-carrying transport air vehicles.
- **Enabling systems design**, including interoperability, net-centric operations (NCO), and sensor systems. For example, the sharing of information across the operational field of use, command-and-control, ad hoc network enabled systems, UAS control and interoperability with both ground and other aerial systems, networked sensor integration, and NCO-related analysis, modeling & simulation.

- **Enabling automation / artificial intelligence**, including innovative AI algorithms, deep learning, cognition and context recognition, with or without big data; advanced sensors, mobile computing, and GPS/INS for autonomous VTOL aircraft operations in cluttered and obstacle rich environments, zero-zero sensor-based auto land, collaborative flight between unmanned and other manned/unmanned rotorcraft systems, networked communications in low altitude flights.
- **Advanced electric-propulsion** including innovative fuel cells, advanced/beyond Li ion batteries, hybrid-electric or alternative multi-fuel power systems for greater range and payload; advanced motors (axial flux, Halbach arrays), inverters and motor controllers, direct drives; high voltage power electronics; hardware testing, modeling and simulation / co-simulation, and integrated power-plant-flight vehicle analysis and design.
- **Improved human-system integration (HSI)** and workload reduction for vehicle and control station operator interfaces.
- **Simulation and testing** of vehicle design, autonomous behaviors, and HSI.
- **Regulatory solutions** addressing the safe operational integration of autonomous VTOL vehicles into national and military airspace, including certification and compliance using consensus standards.

**Abstract Submittal:** Abstracts should be limited to no more than 1,000 words, present the status of work and the background data to be used, summarize figures and illustrations to be used (with samples), and include a summary of important conclusions with a statement as to whether similar results have been (or may be) presented or published elsewhere. The abstract should be sufficient to enable the reviewer to determine the quality, scope, significance, and current completion status of the information that will be submitted in the final paper. Priority will be given to papers in which significant results and conclusions will be provided and in which future research and development are clearly defined.

**Abstracts must be submitted no later than September 15, 2022** to the meeting Technical Chairperson **Bryan Chu**, [bryan.c.chu@boeing.com](mailto:bryan.c.chu@boeing.com)  
Questions? +1-480-8239768

**Completed Papers:** Authors will be notified of final selection by **October 31, 2022**. Format for the papers will be sent with the notification of selection. No paper will be scheduled for presentation if a written paper has not been received by **January 16, 2023**. It's the author's responsibility to obtain all necessary clearances and releases.

**Additional Information:** More information is posted on the VFS International website at [www.vtol.org/autonomous](http://www.vtol.org/autonomous). For questions on the meeting, please contact the Administrative Chairman, at [tonja.k.reinert@boeing.com](mailto:tonja.k.reinert@boeing.com)

## 10th Annual Electric VTOL Symposium

The Technical Meeting is being held in conjunction with the 10th Annual Electric VTOL Symposium, which will be held in parallel. The Technical Meeting will feature technical papers and presentation solicited through this call for papers, while the Symposium will feature invited presentations, panel sessions and discussions on electric and hybrid-electric VTOL aircraft, with a focus on urban air mobility.