# Request for Information (RFI) on Vertical Take-off and Landing (VTOL) Capabilities and Associated Technology

**THIS NOTICE IS NOT A REQUEST FOR PROPOSAL.** This notice is for information and planning purposes only. This RFI does not constitute a solicitation for bids or proposals and it is not to be construed as a commitment by the Government. The information herein is subject to change and in no way binds the Government to solicit for or award a competitive contract. The Government is not obligated to and will not reimburse any costs associated with preparing or submitting a response to this notice and submittals will not be returned to the sender.

**Background and Objective:**

The United States Air Force is assessing the global impact of transformative VTOL aircraft. This RFI targets information about this technology and industry to shape a collaborative strategy with commercial partners in a way that accelerates development and fielding of the most promising vehicles, subsystems, and infrastructure based on likely success in the commercial market. As these systems mature towards certified commercial operations, the Air Force will position itself to be an early adopter, with a potential goal of procurement and fielding within three years.

The core technologies of interest include emerging electric VTOL (eVTOL), non-traditional electric, hybrid, and non-electric aircraft for manned, optionally-manned, unmanned, urban air mobility (UAM), and cargo transport missions, as well as the subsystems and infrastructure required to sustain and maintain them. Based on emerging commercial trends, these transformational commercial vehicles are characterized by employment of distributed electric propulsion for vertical flight and potential use of a wing for horizontal flight along with highly augmented flight control systems or high levels of automation or autonomy. The focus in this RFI is on vehicles with significant commercial market potential. Given other DoD projects with small and medium unmanned aircraft systems (UAS), this current RFI is primarily focused on manned aircraft (of all weights) or unmanned aircraft with a maximum gross takeoff weight (MGTOW) greater than 1320 lbs.

These platforms could introduce game-changing capabilities for distributed logistics, sustainment, mass, and maneuver, with particular utility in civil and military disaster relief, medical evacuation, firefighting, installation and border security, search and rescue, and humanitarian operations. The Air Force intent would be to capitalize on the commercial investments already made in developing these aircraft, to help facilitate their rapid maturation, and to do so on a minimal and non-interference basis with planned commercial development and fielding. The USAF would also hope to leverage future large-scale commercial production.

For potential partners developing flying vehicles, the USAF intends to hold a series of test and development campaigns tailored to the needs of each firm, offering use of DoD-unique resources, such as those mentioned herein, to reduce the industry's technical, regulatory,

and financial risk. These events could allow partners to use DoD test infrastructure and ranges intended to refine designs and drive systems towards their certification objectives with the Federal Aviation Administration (FAA). The USAF believes this may open opportunities for DoD long-term procurement options or revenue generating military use-cases prior to commercial certification. The intent of these efforts is to create more lucrative investment opportunities for industry, incentivize capital flow, and accelerate fielding of aircraft. This RFI seeks feedback from prospective partners; such feedback may influence the developing USAF acquisition strategy.

The USAF recognizes the criticality of systems developed to enhance, support, and sustain these platforms, and is therefore interested in technologies, including but not limited to: autonomy; advanced aircraft materials and manufacturing; novel acoustics techniques; subsystem, aircraft, and portfolio design tools; rapid mission planning for dense air environments and logistics efficiencies; command and control of air vehicles; robotic landing gear; large flotation devices; modular payload designs; air vehicle data networks and RF waveforms; sense and avoid architectures, algorithms, and sensors; electrical power storage, generation, charging; alternative onboard and ground-based electrical power generation; distributed electric propulsion control techniques. The USAF aims to understand the maturity and needs of these industry segments to inform the holistic strategy for this industry with opportunities such as Small Business Innovative Research funds, startup accelerators, incubation space, test equipment, peer review, etc.

**Instructions for RFI Responses:**
The primary purpose of this RFI is to understand the commercial technology readiness levels and assess interest in USAF incentives and opportunities aimed at accelerating the development of transformational commercial VTOL and associated technologies. As such, this notice requests key information and technical data from interested parties. As an RFI and not a request for proposals, there are no limitations or minimum requirements for submissions, and the Government is not obligated to review or respond to all information submitted.

Below is a list of data relevant to shaping the strategy of this effort. Please provide as much additional information as deemed appropriate. Further detail may be requested in follow-on information requests or solicitations, which may be individual or collective, and respondents are free to suggest additional metrics that the government should consider in any future requests.

**Information Requested:**

- Please provide a slide presentation in PDF format or a written narrative that clearly defines your air vehicle, technologies, program, accomplishments and intentions to commercialize. The suggested length is 15-20 slides for a presentation or 3-5 pages for a narrative. Other presentation forms are acceptable.
- Title page — include company and partner information, along with other traditional customary information (logo, photograph, date, recipient, disclosure statements, etc.)

- Basic company information – Address, Telephone Number, Email Address, Technical and Business and/or Legal Points of Contact for follow-up questions as necessary.
- Describe the "Who, What, When, Why, and How," of your program and company
- Intellectual property/modularity/interoperability information or concerns
- A description of your investment portfolio — funding to date and sources of funds (entity names and nationalities); current activities and spend rate; anticipated additional resources to mature the aircraft to the start of, or through certification processes; timeline of commitments, needed funding events, and/or contracts.

Aircraft Developers Only:

- Basic aircraft description, mode of operation, dimensions, three view drawing, high-level aircraft and system masses (maximum gross weight, empty weight, battery and fuel weight, useful load, payload, additional levels of detail if possible), payload-range for performer defined operating conditions / mission profile.
- Number of full-scale aircraft built, variants and descriptions, number of aircraft planned to be completed over the next 24 / 36 months.
- Timeline and locations of flight tests conducted with images; brief description of flight approval process; approximate projected cost of flight test per month at performer defined operational tempo; preferred test range for future and continued testing; special test equipment requirements. Discuss what type of in-kind support would be most beneficial.
- Would it be possible for the government to procure flight articles for continued experimentation within three years from now? When? What type of arrangement would be beneficial to accelerate your time to market and what is the potential cost to the government and/or the potential for in-kind exchanges?
- Describe plans to transition/commercialize your product and the types of variants you anticipate; include information on engagements and ideas that you have socialized with potential customers, including foreign governments, and include any feedback.
- A timeline of the objectives and risk reduction plans for development and continued operations, including key future milestones in support of airworthiness certification; key flight milestones and production schedules; near, mid, and long-term technology insertions and capabilities; and the targeted maturity by the end of 2023.
- Tabulated Data: Provide a concise definition of the performance capabilities, energy system, and the size-weight and power characteristics of the aircraft. This data is requested in the format defined in the attached EXCEL file. Respondents are requested to provide as much detail as possible. Low confidence data (estimates, unverified predictions) should be indicated as such using red text.

Associated Technologies (Not Aircraft):

- Technical details relevant to your technology and its use in the VTOL market.

- Government resources and partnerships that would be valuable to the development of your technology or business. Examples include participation in a startup accelerator, incubation space with relevant equipment, test or demonstration, peer review, etc.

All Respondents:

- Finally, the USAF welcomes perspectives or comments from the respondents on what they believe would be valuable support in facilitating the successful execution of their developmental, test, and fielding efforts. Information may include performance timelines, funding requirements, in-kind assistance, requests for information or support, proposed concepts of operations, or other considerations that you would like to bring to the attention of the government. The intent of this is for the Government to receive information to understand common considerations across the industrial base, facilitate the development of possible future programs that accommodate the needs of the performers, and to identify opportunities that align with DoD's interests.

**Disclaimer and Notice:** This is a Request for Information only and does not constitute a commitment, implied or otherwise, that the USAF will take procurement action in this matter. This is NOT a solicitation for proposals, applications, proposal abstracts, or quotations. The Government does not intend to award a contract on the basis of this RFI or to otherwise pay for the information solicited; responses will be treated as information only and will not be considered a proposal. This RFI is issued for the purpose of obtaining knowledge and information for project planning purposes only. This RFI shall not be construed as an obligation on the part of the Government. Further, the Government will NOT be responsible for any cost incurred in furnishing this information.

By submitting information in response to this RFI, submitters consent to the release and dissemination of submitted information to any US Government personnel or US Government contractors working on this effort for review. As such, to the extent that any information submitted in response to this RFI is marked as proprietary or business-sensitive information, submitters are hereby notified (a) about the potentiality that such information submitted may be disclosed to Government third party contractors supporting this program, (b) that submission of information in response to this RFI constitutes consent to such handling and disclosure of submitted information to those parties, and (c) that such proprietary information will be handled in a manner consistent with applicable federal law.

The Government reserves the right to use information provided by respondents for any purpose deemed necessary and legally appropriate. Any organization responding to this notice should ensure that its response is complete and sufficiently detailed. Information provided will be used to assess tradeoffs and alternatives available for a potential requirement and may lead to the development of a solicitation. Respondents are advised that the Government is under no obligation to provide feedback to respondents with respect to any information submitted.

**Confidentiality:** Respondents may only provide unclassified RFI responses. Respondents must indicate whether their responses contain proprietary information and must mark any portions of their responses containing proprietary information if the respondents wish for the responses to be handled as such.

**Responses/Inquiries:**

Responses must be received no later than noon EST on 17 December 2020.

All responses and/or questions pertaining to this RFI should be submitted in writing to flyorbs@afwerx.af.mil.

In addition, Answers to Frequently Asked Questions (non-attributional) may be posted on the SAM Contracting Opportunities website (which has replaced FedBizOpps) at https://beta.sam.gov