White Paper

Uncrewed Aerial Systems “UAS” using Beyond Visual Line of Sight “BVLOS” Operations:

Research to Improve Government and Industry Collaboration and Consensus

ATARC Drones In Government Working Group

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ATARC

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Highlights from research conducted by the ATARC Drones in Government Working Group “DGWG” (currently disbanded) to review the FAA UAS BVLOS Aviation Rulemaking Committee “ARC” final report dated March 10, 2022 to identify any potential ideas or methods with the potential to improve stakeholder collaboration and unanimity

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Preface

The advent and potential benefits of utilizing UAS BVLOS to reduce risk, improve safety, and save money for current and future applications within the United States National Aerospace System “NAS”, are astonishing. There appears to be no shortage in potential social, environmental, and economic benefits to using UAS BVLOS to meet unique government and private operational requirements in the US; however, the speed at which regulations and technology can be introduced, while working with the vast number and array of industry stakeholders to develop and deliver FAA regulations, is no small task.

As stated on page 11 of the ARC final report: “It has become evident that the current aviation regulatory framework is not capable of accommodating UA operations at the existing levels, and certainly not at the levels anticipated as the industry grows.”

On March 10, 2022, the UAS BVLOS ARC published a comprehensive and compelling Final Report, that included an Executive Summary stating, “there is complexity of unanimity of views among the committee members, and dissenting opinions driving next steps and the priority of next steps regarding UAS BVLOS”. Despite the challenges, the ARC delivered five important recommendations, based on risk considerations. The three hundred and eighty (380) page report provides a great deal of information regarding the committee's chartered objectives, membership, approaches to meeting it's objectives, recommendations for first steps toward BVLOS rulemaking, potential benefits of initial rulemaking, risk and risk mitigation considerations, environmental considerations, BVLOS qualification standards, privacy and security issues, training requirements, UAS manufacturer Declaration of Compliance considerations, operator qualifications, work group and task management, and much more. Despite the papers comprehensive detail, the UAS BVLOS ARC concern for stakeholder unanimity presents the reader with a known risk in meeting the committee's objectives. It is important to note that obtaining stakeholder consensus and improving unanimity regarding any aviation need of this magnitude is difficult; yet, it is because of this challenge that the DGWG conducted research to uncover any ideas and methods that might have the potential to improve the outcome regarding this matter.

Therefore, in preparation to present the reader with final thoughts and recommendations related to improving UAS BVLOS stakeholder collaboration and consensus, this paper provides the following:

1. The composition of the ARC members;
2. The UAS BVLOS final report recommendations; and
3. The current state of UAS BVLOS rulemaking and regulations

The Composition of the UAS BVLOS Aviation Rulemaking Committee

Under comments in the final report dated March 10, 2022, the ARC included a diverse community of experts to ensure recommendations were considered from a variety of stakeholders. This included:

1. Academia and standards bodies;
2. Critical infrastructure owners and operators;
3. Infrastructure security;
4. Privacy groups;
5. State, local, tribal, territorial interests – including environment and equity considerations;
6. Technology and network infrastructure interests;
7. Traditional aviation associations; and
8. UAS associations

The ARC report recognizes, *"that the large number of stakeholders, (90 in total comprised of voting members, alternates, observers, and governmental partners) and the variety of perspectives made consensus on the recommendations an ambitious goal".* The report continues to explain that the COVID pandemic exasperated the effort along with the aggressive time frame granted to deliver the report.

The UAS BVLOS ARC Final Report Recommendations

1. Set an acceptable level of risk (ALR) for UAS that can be applied consistently across all types of operations being performed that allows the FAA to adopt a common and consistent set of regulations and guidance that gives operators the flexibility to meet the ALR through qualitative or quantitative methods, or a hybrid approach.
2. Create a series of modifications to the right of way rules in Low Altitude Shielded Areas (within 100' of a structure or critical infrastructure as defined in 42 U.S.C. § 5195c) 2 and in Low Altitude Non-Shielded Areas (below 400') to accommodate UA operations. Specifically, the ARC recommended several amendments to 91.113 that includes: (a) an automatic means for see-and-avoid responsibilities in shield areas, (b) over crewed aircraft not equipped with ADS-B or TABS in non-shielded low-altitude areas, and finally for crewed aircraft that are equipped with ADS-B or TABS in Non-shielded low-altitude areas.
3. Set new qualifications and subsequent modifications to extend Part 107 remote pilot certification to cover the unique requirements of BLVOS based on specific UA systems, use-cases, and operational restrictions.
4. Establish a new BVLOS Rule which includes a process for qualification of UA and UAS, applicable to aircraft up to 800,000 ft-lb of kinetic energy.
5. Adopt a non-mandatory regulatory scheme for third-party services to be used in support of UAS BVLOS operations.

These five recommendations excluded some considerations outside the scope of UAS BLVOS ARC charter. See final report[1]

The Current State of UAS BVLOS Rulemaking and Regulations

The current state of UAS BVLOS rulemaking and regulations has changed substantially since the release of the March 10 ARC report. In obtaining data from the official regulations.gov site, the reader is invited to use "BVLOS" as search criteria to uncover more than 1150 submissions related to exemptions, amendments, decisions and responses, as well as (four) 4 Notices and one (1) proposed Rule. While not an all-inclusive list of the industries involved in submitting BVLOS waivers related to these, a few involved include agriculture, power authorities, infrastructure inspections, balloon operations, and package delivery. The four (4) Notices include two (2) that address the release of the UAS BVLOS Final Report and the subsequent meeting for public comment. The other two (2) Notices pertain to a Petition for Exemption and its associated response. The one (1) and only proposed Rule was associated with the recommendation in the UAS BVLOS ARC Final Report to expand BVLOS operations for certain operating environments with the appropriate safety mitigation to avoid any adverse safety impact. The Rule also sought to solicit input from industry to gather additional technical, cost, and environmental information on key concepts and potential approaches that the FAA should consider for use in future exemptions.

Some of the more significant advances in UAS BVLOS rulemaking since 2019 include:

1. The Part 107 Waiver Process: The inclusion of a Part 107 waiver process, where UAS operators can apply to conduct BVLOS operations on a case-by-case basis where they are required to demonstrate how they would ensure safety and compliance during BVLOS flights. The FAA evaluates these waiver requests based on the specific circumstances of the operation.
2. The FAA UAS Integration Pilot Program (IPP): The FAA set this program up to work directly with state, local, tribal, and industry partners to conduct BVLOS operations and gather data to assist in the formation of rulemaking and regulations. The FAA anticipated that the lessons learned from the IPP would influence the development of BVLOS rules.
3. The Remote ID Rule: In December 2020, the FAA published a Remote Identification (Remote ID) rule. Remote ID is a critical component for BVLOS operations, as it allows the tracking and identification of drones. This rule required that most UAS operators comply with Remote ID standards.
4. Proposed Rulemaking: The FAA issued a Notice of Proposed Rulemaking (NPRM) in 2019 to solicit public comments and input on proposed BVLOS regulations. The NPRM process typically involves reviewing public feedback and making adjustments to the proposed rules before finalizing them.

[1] https://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/UAS_BVLOS_ARC_FINAL_REPORT_03102022.pdf

While BVLOS rulemaking has advanced through the delivery of the UAS BVLOS ARC and Federal Registry websites, there are opportunities to provide access to cross-referenced information and/or automation that have the potential to improve unanimity among stakeholders.

Final Thoughts and Recommendation to Improve Stakeholder Collaboration and Unanimity

The need for Government and Industry partnership to judiciously accelerate the development and delivery of UAS BVLOS rulemaking is paramount given the vast social, environmental, and economic benefits identified in the UAS BVLOS Final Report. Research and development, testing, validation, operations along with unanimity and consensus among stakeholders to adopt critical aviation infrastructure regulations has historically been an arduous process and presents a real challenge. It is important to note that the challenge and subsequent concern was not ignored by the UAS BVLOS ARC, as they addressed it in the Executive Summary of the Final Report issued on March 10, 2022. It was this concern that led the ATARC DGWG to target any notable ideas or methods that could have the potential "to improve unanimity and reduce dissenting concerns among stakeholders".

Before introducing the reader to the DGWG proposed idea and method to improve stakeholder collaboration and consensus, it is important for readers interested in keeping abreast of UAS BVLOS regulations, to frequently visit the UAS BVLOS ARC, Regulation, and Federal Registry websites, as rulemaking is still evolving at a rapid pace. These sites can act as a hub for stakeholders to stay abreast of the most current information and programs being used to develop BVLOS regulations. These sites are designed to provide the reader with the most recent Advisory Circulars, Orders and Notices, and rulemaking decisions. These sites offer simple, but effective, search capabilities for open and closed information, documentation regarding work involving the ARC, and regulatory updates. These include sorting and more advanced features to distinguish advisory and rulemaking committee activities, document types that cover charters, agendas, meetings, notices, recommendations, tasks, and task comments.

Recommendation

To improve awareness, collaboration, and unanimity among BVLOS stakeholders, the DGWG recommends the creation and publication of a dynamic (continually updated) table (matrices), similar to the Appendix B of the final report), that uses unique and specific stakeholder operations and functions as context, (example: agriculture, power line inspection, bridge inspection, balloon operations, package delivery, etc.) to cross-reference any associated published advisories, notices, and/or rulemaking

https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/committee/browse/committeeID/837

https://www.federalregister.gov/documents/2023/05/25/2023-11024/uas-beyond-visual-line-of-sight-operations

document ID's (example: https://www.regulations.gov/document/FAA-2023-1256-0001), subsequent and Federal Register numbers (example: https://public-inspection.federalregister.gov/2023-11024.pdf), and any applicable CFR and Parts (example: in the case of Document ID: FAA-2023-1256-001 provided, it applies to 14 CFR Parts 61, 91, 107, and 135) currently published on Regulations.gov. For added benefit, the references should be hyperlinked to the referred Document ID, Federal Registry Number, and CFR Part(s). See figure 1.

While the UAS BVLOS ARC, regulations.gov and federalregister.gov sites can search to find information pertaining to specific operations or functions, the sites are not contextual based on these. This leaves the researcher to first identify an associated FAA document to conduct a search. The ARC and BVLOS stakeholders should consider developing an evolving (dynamic) cross-reference table (matrices) to cover the reverse. See figure 1.

A table using operations and functions as context, which then cross-references to the applicable FAA documents would provide stakeholders with a more intuitive means of finding and viewing information applicable to their use case. A tool of this nature has the potential to vastly reduce the time it takes for stakeholders to perform research related to their unique and specific operations and functions.

Figure 1: Operational and Functional Cross-Reference Table

	Document ID	Federal Register #	CFR(s)	Points of Contact	etc.
Power Line Inspection					
Bridge Inspection					
Balloon Operations	FAA-2023-1256-0001	2023-11024	14 CFR Parts		
Agriculture					
etc					

https://www.regulations.gov/search?filter=BVLOS

https://www.federalregister.gov/documents/2023/05/25/2023-11024/uas-beyond-visual-line-of-sight-operations

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