

Applicant Specific Guidance Memorandum for Additive Manufacturing

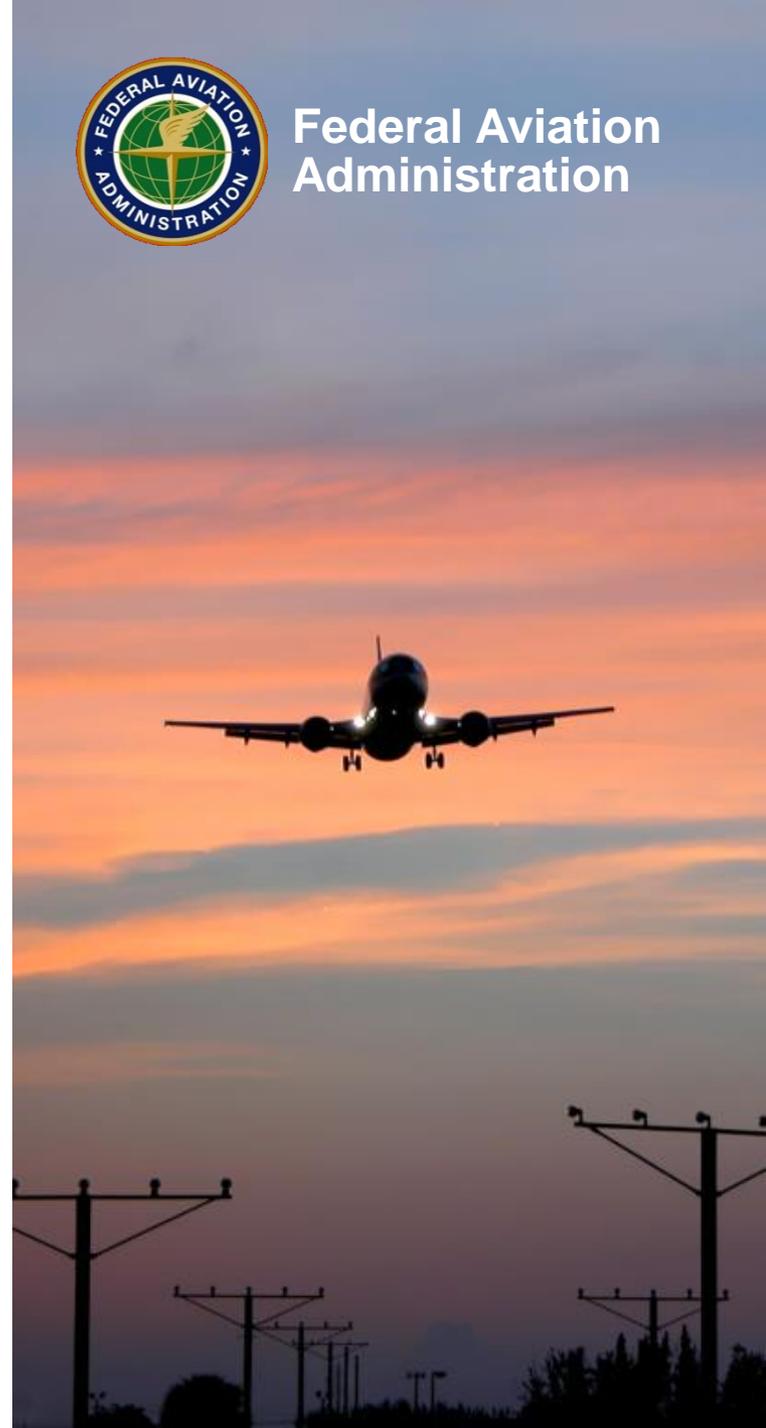
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Federal Aviation
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Issue

- In some AM certification projects, the information provided by applicants early in the certification program did not provide an adequate understanding of their overall approach to certification.
- This resulted in program delays, as we exchanged questions and answers and was not a productive use of industry or agency resources.
- This also resulted in the use of Issue Papers, where they were really not necessary.

It became clear that we need an early understanding of the “big picture” of the applicants approach to certification, including the criticality of the AM part(s).

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Approach

- **AIR-621 led the development of an Applicant Specific Guidance Memorandum (ASGM) for AM to address these issues.**
- **The ASGM is used to:**
 - Standardize the information requested from the applicant, early in a certification project, including the part failure consequence, and their approach to certification.
 - Determine further involvement of the Policy & Innovation Division in the certification project.
 - Support the FAA decision on whether an Issue Paper is necessary.
- **There are Issue Papers available for each Product Type. However,**
 - Getting the applicant response to the ASGM for AM early in the certification program is expected to reduce the use of Issue Papers.

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Status

- We have used the ASGM on many AM certification projects.
- The ASGM is intended to be revised as we gain experience with the use of the ASGM.
- The ASGM can be tailored for each applicant.
- The ASGM has been uploaded to Issues Lists*
- AIR-621 has conducted many internal briefings on the ASGM. This is our first briefing to the public.

*Update of the internal and external Issues Lists is complete. International non-basic lists are pending.



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Process Flow

- Additive Manufacturing remains on the each Product Issue's List.
- The ACO will work with the applicant to obtain the information identified in the ASGM.*
- The ACO will provide the Applicant ASGM responses to AIR-621.
- The Policy & Innovation division involvement in AM certification projects is based on the Issues List [coordination criteria](#).
 - Included with the internal Issues Lists.
 - The coordination criteria recognizes that AM components can include AM parts in structures, aircraft systems, propulsion / engines, and cabin safety applications.

* ACO is used in this presentation as inclusive of ACO Branches, FAA Oversight Offices, and the International Validation Branch. The International Validation Branch will coordinate with the FCAA.



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Policy & Innovation Division will be involved when:

- Material design values will be developed; or
- Fatigue, fail-safe, or damage tolerance evaluations will be performed; or
- Rotorcraft or propeller critical parts are involved; or
- Involves aircraft systems components where the failure of the component results in a system hazard that is classified as Major or higher per AC 2x.1309 or 23.2510; or
- Involves engine or propeller components where the failure of the component results in a hazard that is classified as Major or higher per AC 33.75 or AC 35.15, respectively; or
- Parts the failure of which could adversely impact occupant protection or emergency egress; or
- The applicant is using a process they have not previously coordinated with AIR-621



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Information requested from Applicant:

1. Identification of Part:

- Description and images to show AM Part locations and how they attach and interface with other parts.
- Material and material specification
- Specific AM process, including machine make/model and other info.
- Part classification (e.g., airframe, propulsion, mechanical system)
- List of applicable reg's and intended MOC (e.g., test, analysis)
- Risk classification

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2. Inspection Plan:

- Approach for how part will be inspected and tested in production:
 - Validated NDI capability.
 - To ensure parts are produced within manufacturing defect limits.
 - To demonstrate the strength and other properties assumed in the design data and required by regulation.

3. Identify:

- The need to develop material design values.*
- The need to perform fatigue or damage tolerance evaluations.*

4. Identify:

- The use of consensus standards.

5. Additional questions for parts above a certain criticality

*May require use of Issue Paper to agree on method of compliance.

Thank you.

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Questions?

