U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Electronic Signatures, Electronic Recordkeeping, and Electronic Manuals

Date: DRAFT **AC No:** 120-78B

Initiated by: AFS-300/ AFS-200 **Change:** 1

1. PURPOSE OF THIS ADVISORY CIRCULAR (AC). This AC provides approval, acceptance, and authorization guidelines for electronic signatures, electronic recordkeeping systems, and electronic manual systems. The guidelines in this AC apply where signatures, records, and/or manuals are required under Title 14 of the Code of Federal Regulations (14 CFR) parts 5, 43, 61, 63, 65, 91, 121, 125, 133, 135, 137, 141, 142, 145, and 147 are in a digital or electronic format.

2. PRINCIPAL CHANGES. This change removes the requirement for 14 CFR part 145 repair stations and 14 CFR part 147 Aviation Maintenance Technician Schools (AMTS) to obtain authorization for electronic/digital systems through Operations Specification (OpSpec) A025, Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manual Systems.

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U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Electronic Signatures, Electronic Recordkeeping, and Electronic Manuals

Date: 12/11/24 **AC No:** AC 120-78B

Initiated by: AFS-300/ AFS-200 **Change:**

This advisory circular (AC) provides standards and guidance for electronic signatures, electronic recordkeeping, and electronic manual systems. The standards and guidance contained in this AC apply to those signatures, records, and manuals required by Title 14 of the Code of Federal Regulations (14 CFR) when those items are in a digital or electronic format. This AC describes an acceptable means, but not the only means, for a certificate holder to utilize an electronic signature, electronic recordkeeping, and electronic manual systems.

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CHAPTER 1. GENERAL INFORMATION

1.1 Purpose of This Advisory Circular (AC). This AC provides approval, acceptance, and authorization guidelines for electronic signatures, electronic recordkeeping systems, and electronic manual systems. The guidelines in this AC apply where signatures, records, and/or manuals are required under Title 14 of the Code of Federal Regulations (14 CFR) parts 5, 43, 61, 63, 65, 91, 121, 125, 133, 135, 137, 141, 142, 145, and 147 are in a digital or electronic format.

Note: This is a guidance document. Its content is not legally binding in its own right and will not be relied upon by the Department as a separate basis for affirmative enforcement action or other administrative penalty. Conformity with the guidance document is voluntary only. Nonconformity will not affect rights and obligations under existing statutes and regulations.

1.2 Audience. The audience for this AC is entities regulated under 14 CFR as described in paragraph 1.5 below.

1.3 Where You Can Find This AC. You can find this AC on the Federal Aviation Administration's (FAA) website at https://www.faa.gov/regulations_policies/advisory_circulars and the Dynamic Regulatory System (DRS) at https://drs.faa.gov.

1.4 What This AC Cancels. AC 120-78A, Electronic Signatures, Electronic Recordkeeping, and Electronic Manuals, dated June 22, 2016, is canceled.

1.5 Applicability. This AC applies to the following regulated entities, which for the purposes of this AC will be identified as "certificate holders":

- Foreign air carriers or foreign persons operating a U.S.-registered aircraft in accordance with 14 CFR § 129.14.
- Certificate holders conducting operations in accordance with 14 CFR part 121, 125 (including part 125 Letter of Deviation Authority (LODA) holders), 133, 135, or 137.
- Fractional ownership program managers conducting operations in accordance with 14 CFR part 91 subpart K (part 91K).
- Operators conducting operations in accordance with 14 CFR part 91.
- Airmen certification course operators and training providers who provide instruction and evaluation in accordance with 14 CFR part 61, 63, 65, 141, or 142.
- Persons performing airmen certification in accordance with 14 CFR part 61, 63, 65, 141, or 142.
- Individuals performing maintenance or preventive maintenance in accordance with 14 CFR part 43.

- Repair stations operating in accordance with 14 CFR part 145.
- Aviation Maintenance Technician Schools (AMTS) who provide instruction and evaluation in accordance with 14 CFR part 147.

Note: The scope of this AC is intended for entities regulated by the FAA's Flight Standards Service (FS) and is not intended to apply to production, design, or manufacturing authority (e.g., type certificate (TC), Supplemental Type Certificate (STC), Parts Manufacturer Approval (PMA), etc.) signature, recordkeeping, and manual requirements established by the FAA's Aircraft Certification Service (AIR).

1.6 Scope. Signatures, records, and manuals as discussed in this AC generally apply to the following categories (this list is not intended to be all inclusive).

1.6.1 Signatures:

- Certification of Training or Qualification;
- Pilot Logbooks;
- Fitness for Duty;
- Flight/Dispatch Release;
- Load Manifests;
- Operational Control Briefing;
- Preflight Risk Analysis Worksheet;
- Maintenance Logbook;
- Airworthiness Release;
- Maintenance Performed;
- Continuous Airworthiness Maintenance Program (CAMP); and
- Extended Operations (ETOPS) Predeparture Service Check (PDSC).

1.6.2 Records:

- Training and Qualification;
- Crewmember;
- Dispatcher;
- Flight, Duty, and Rest;
- Dispatch Release;
- Flight Release;
- Load Manifest;

- Communication;
- Maintenance Records;
- Maintenance Log;
- Airworthiness Release; and
- Safety Management System (SMS) Records required by 14 CFR § 5.97.

1.6.3 Manuals:

- Flight Operations (including dispatch, flight following, and onboard/cabin);
- Ground Operations (including ground and passenger handling);
- Certificate Holder Aircraft Performance Manuals (Airplane Flight Manual (AFM) and Weight and Balance (W&B) information, etc.);
- Training Program;
- Maintenance (including overhaul, standard practices, etc.);
- Minimum equipment list (MEL);
- General Policy and Procedures; and
- User (e.g., flight management system (FMS), flight planning system, etc.).

1.7 Background.

1.7.1 Electronic Signatures and Electronic Records. Public Law (PL) 105-277, Title XVII, Government Paperwork Elimination Act; PL 106-229, Electronic Signatures in Global and National Commerce Act (E-Sign Act); and Office of Management and Budget (OMB) Memorandum M-00-15, OMB Guidance on Implementing the Electronic Signatures in Global and National Commerce Act, encourage the use of electronic records, signatures, and alternative information technologies, and allow Government agencies to develop performance standards for their use. OMB Circular A-130, Managing Information as a Strategic Resource, provides general guidance for federal organizations regarding the use of electronic signatures in connection with electronic records and electronic transactions. The use of these electronic technologies also supports the goals of PL 107-198, Small Business Paperwork Relief Act of 2002. This AC provides guidelines on meeting the FAA's performance standards developed in accordance with the listed PLs and OMB memorandum.

1.7.2 Electronic Manuals. On October 29, 2002, the FAA first published standards and guidance for electronic signatures, electronic recordkeeping, and electronic manual systems in this AC. On May 30, 2023, the FAA amended its 14 CFR regulations for manual requirements to accommodate technology (refer to 88 FR 34437, Updating Manual Requirements to Accommodate Technology, dated May 30, 2023). In 88 FR 34437, Section IV, Discussion of the Final Rule, the FAA stated that, "for revision control purposes, there needs to be a method to confirm that employees are using the most current manual when performing their job duties. The FAA determined that the

most straightforward way to confirm use of the correct version is to display the date of revision while giving the air carrier the flexibility of determining where to put that date." Accordingly, this AC contains standards and guidelines for electronic manual systems that provide an acceptable means, but not the only means, to use an electronic manual system.

1.8 Definitions. The following terms are used in this AC:

1.8.1 Authentication. The means by which a system validates the identity of an authorized user. These may include a password, a personal identification number (PIN), a cryptographic key, a smart card, etc.

1.8.2 Computer-Based Recordkeeping System. A system of record processing in which records are entered, maintained, archived, and retrieved electronically. The term "computer-based recordkeeping system" is synonymous with "electronic recordkeeping system."

1.8.3 Data Backup. Use of one of several recognized methods of providing a secondary means for archiving records, separately from the original or primary. The backup can be used to reconstruct the format and content of electronically stored records in case of loss, failure, or damage to the primary recordkeeping system.

1.8.4 Data Verification. A process of ensuring accuracy of data records by systematically or randomly comparing electronic records with manual data entry documents.

1.8.5 Digital Electronic Signature. A type of electronic signature that uses cryptography to verify the source of digital data is authentic and ensures data integrity has not been compromised.

1.8.6 Electronic Manuals. Certificate holder manuals that may be electronically signed, stored, and retrieved by a computer system via the internet/intranet, or via other various forms of electronic media.

1.8.7 Electronic Record. A contract or other record (including operations specifications (OpSpecs)) created, generated, sent, communicated, received, or stored by electronic means.

1.8.8 Electronic Recordkeeping System. A system of record processing in which records are entered, signed, stored, and retrieved electronically. The term "electronic recordkeeping system" is synonymous with "computer-based recordkeeping system."

1.8.9 Electronic Signature. Functionally equivalent to a handwritten signature. The term "electronic signature" means an electronic sound, symbol, or process attached to, or logically associated with, a contract or other record and executed or adopted by an individual with the intent to sign the record.

1.8.10 Operations Specifications (OpSpecs). Documents created and issued by the FAA through the Operations Safety System (OPSS) are collectively referred to as "authorizing

documents." For the purposes of this AC, the use of the term "OpSpec" hereafter refers to one or more of the following OPSS authorization documents:

1.8.10.1 Management Specifications (MSpecs). Issued to program managers who conduct fractional ownership operations under 14 CFR part 91K.

1.8.10.2 Operations Specifications (OpSpecs). Issued to certificate holders operating under 14 CFR part 121, 125, 129, 135, 137, 145, or 147.

1.8.10.3 Letters of Authorization (LOA). Issued to 14 CFR part 91 operators; certificate holders operating under 14 CFR parts 133, 137, and 141; and 14 CFR part 125 LODA holders.

1.8.10.4 Training Specifications (TSpecs). Issued to 14 CFR part 142 training center certificate holders.

1.8.11 Password. An identification code or device required to access stored material, intended to prevent information from being viewed, edited, or printed by unauthorized persons.

1.8.12 Private Key. A cryptographic key that is used with an asymmetric (public key) cryptographic algorithm. For digital electronic signatures, the private key is uniquely associated with the owner and is not made public. The private key is used to create a digital electronic signature that may be verified using the corresponding public key.

1.8.13 Public Key. A cryptographic key that is used with an asymmetric cryptographic algorithm and is associated with a private key. The public key is linked to an owner and may be made public. For digital electronic signatures, the public key is used to verify a digital electronic signature that was generated using the corresponding private key.

1.8.14 Signature. A mark or sign made by an individual to signify knowledge, approval, acceptance, or obligation, and to authenticate a record entry. A signature should be traceable to the individual making the entry, and it should be handwritten or part of an electronic signature system.

1.9 Approval, Acceptance, and Authorization. There are many 14 CFR part regulations that address electronic signatures, records/recordkeeping, and manuals. There are varying requirements between the many 14 CFR parts for approval, acceptance, and authorization. The FAA explains these terms in FAA Order 8900.1, Volume 3, Chapter 1, Section 1, General.

1.9.1 FAA Approval. FAA approval is required to use the following electronic manual and recordkeeping systems:

1.9.1.1 Electronic MEL. Title 14 CFR §§ 91.1115(a)(2), 121.628(a)(2), 125.201(a)(2), and 135.179(a)(2) certificate holders who conduct operations under 14 CFR part 91K, 121, 125, or 135 must provide flightcrews with direct access to the MEL through printed or other means approved by the Administrator.

1.9.1.2 Title 14 CFR Part 121 Crewmember and Dispatcher Records. Title 14 CFR § 121.683(c) allows a certificate holder to use a computerized recordkeeping system, approved by the Administrator, to maintain crewmember and dispatcher records required by 14 CFR part 121.

1.9.1.3 Title 14 CFR Part 125 Crewmember Records. Title 14 CFR § 125.401 allows a certificate holder conducting 14 CFR part 125 operations to use a computerized recordkeeping system that is approved by the Administrator to record and maintain crewmember records required by 14 CFR part 125.

1.9.2 FAA Acceptance. With the exception of the items that require FAA approval (see paragraph 1.9.1 above), FAA acceptance will be used for certificate holders to use electronic signatures, electronic recordkeeping systems, and electronic manual systems to satisfy the requirements of 14 CFR parts 91K, 121, 125, 133, 135, and 145. FAA acceptance will also be used for certificate holders who use electronic records, and the electronic signatures associated with those records, to satisfy the requirements of 14 CFR parts 141 and 142.

1.9.3 Authorization in OpSpec A025. The FAA will authorize the use of electronic signatures, electronic recordkeeping systems, and electronic manual systems via OpSpec A025, Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manual Systems. The OpSpec A025 template name varies by regulatory part. The OpSpec A025 authorization applies to 14 CFR parts 91K, 121, 125, 133, 135, 141, and 142. It is important to note that the FAA does not require a certificate holder to use electronic signatures, electronic recordkeeping systems, or electronic manual systems. The use of these electronic systems is optional. However, if a certificate holder elects to exercise this option, that authorization is issued via A025. FAA guidance on the issuance of OpSpec A025 is in Order 8900.1, Volume 3, Chapter 18, Section 3, Part A Operations Specifications—General, and Volume 3, Chapter 18, Section 14, Parts A, B, and D Letters of Authorization for 14 CFR Part 141 Pilot Schools, for 14 CFR part 141.

1.9.4 The FAA Will Use OpSpec A025 as the Method to Convey Approval, Acceptance, and Authorization. The FAA will use OpSpec A025 as the method to convey FAA approval or acceptance for those items that require specific FAA approval or acceptance to be maintained, accessed, furnished, or distributed electronically. The signature on the OpSpec by the FAA principal inspector (PI) or other aviation safety inspector (ASI) with OpSpec signature authority indicates the FAA's approval or acceptance of the item (depending on the requirement). When the FAA issues OpSpec A025 in OPSS, the certificate holder is authorized to use the electronic items listed as of the effective date of the active OpSpec. This date also signifies the effective date of FAA approval or acceptance.

1.9.5 There is No Requirement for the Issuance of OpSpec A025 for 14 CFR Part 61, 63, 65, 91 (Excluding 91K), 129, 137, 145, or 147. OpSpec/MSpec/TSpec/LOA A025 does not apply to operations under these parts. However, the FAA recommends that all certificate holders follow the guidelines for electronic signatures, records, and manuals as set forth in the AC, regardless of whether or not approval, acceptance, or authorization is required.

If a required signature, record, or manual provided in an electronic format or application does not contain the key elements or does not follow the guidelines set forth in this AC, the FAA may question its validity. If the FAA determines that an electronic signature, record, or manual is missing key elements, does not follow the guidelines, or is otherwise unacceptable, the FAA office with oversight responsibility will notify the certificate holder in writing. Upon receiving notification, it is incumbent upon the certificate holder to make the appropriate corrections.

1.9.6 Certificate Holders Who Have Authority in OpSpec A061 to Use an Electronic Flight Bag (EFB) Program. OpSpec A025 is the authorization for the use of electronic signatures, electronic recordkeeping systems, and electronic manual systems. For certificate holders who have authorization to use an EFB program in accordance with OpSpec A061, electronic signatures, electronic recordkeeping systems, and electronic manual functions may co-reside and/or otherwise be displayed on an EFB, provided the certificate holder has authority to use these items in OpSpec A025.

CHAPTER 2. ELECTRONIC SIGNATURES

2.1 Electronic Signatures. Public Law (PL) 106-229, Electronic Signatures in Global and National Commerce Act (E-Sign Act), defines an electronic signature as an "electronic sound, symbol, or process, attached to or logically associated with a contract or other record and executed or adopted by a person with the intent to sign the record."

Note: Throughout this AC, the term "electronic signature" refers to either electronic signatures or digital signatures. The specific electronic signature used depends on the end user's preference and the system application.

2.1.1 Digital Electronic Signatures. Digital electronic signatures are electronic signatures that incorporate encryption and decryption technology. Digital electronic signatures that use this technology are typically the most secure because of the controls that are inherent with the technology itself.

2.1.1.1 Digital Cryptography. Digital electronic signature technology is based on Public Key Infrastructure (PKI) cryptography. PKI is a framework established to issue, maintain, and revoke public key certificates, which are essential for verifying identities and securing communications. Although different, the public and private keys in a key pair are mathematically linked. To ensure the authenticity of a digital electronic signature, PKI incorporates the use of a digital certificate to authenticate the signer's identity. A digital certificate is issued by a trusted party known as a certificate authority (CA). The CA verifies the identity of the digital certificate holder and issues the digital certificate, assuming responsibility for vouching for the individual's identity.

2.1.1.1.1 Public Key. A public key is used to verify a digital electronic signature that was generated using the corresponding private key. A more detailed definition of public key is contained in paragraph 1.8.13.

2.1.1.1.2 Private Key. The private key is used to create a digital electronic signature that may be verified using the corresponding public key. A more detailed definition of private key is contained in paragraph 1.8.12.

2.1.1.2 Controls. Digital electronic signatures that use PKI and incorporate digital certificate authentication contain controls that ensure the authenticity of the signature. This technology also ensures the signature is permanently embedded in the document, record, or data in such a way as to render the content unalterable without a new signature.

2.1.2 Key Elements of an Electronic Signature. The following key elements comprise an electronic signature and ensure its validity. In accordance with PL 106-229, an electronic document or record that contains a valid electronic signature or authentication may not be denied legal effect, validity, or enforceability solely because it is in electronic form.

2.1.2.1 The signature is unique to the signer.

2.1.2.2 There are means to identify and authenticate a particular person as the signer.

2.1.2.3 The signature is under the sole control of the signer.

2.1.2.4 The electronic signature is executed or adopted by a person with the intent to sign.

2.1.2.5 The electronic signature is the result of a deliberate action taken by the signer to affix their signature.

2.1.2.6 The electronic signature prevents the signer from denying that they affixed a signature to a specific record, document, or body of data (nonrepudiation).

2.1.2.7 The electronic signature is permanent and the information to which it is attached is unalterable without a new signature.

2.1.2.8 A document, once signed, cannot be edited.

2.1.3 Electronic Signatures on Regulatory Records. An electronic signature that is affixed to any record required by 14 CFR part 91K, 121, 125, 133, 135, 141, 142, 145, or 147 will require a certificate holder to have an FAA-approved or FAA-accepted (depending on the regulatory requirement) electronic recordkeeping system. These systems are discussed in detail later in this AC.

2.2 Electronic Signature Process. A certificate holder who desires to use electronic signatures should have a definitive process that ensures all of the elements that comprise a valid electronic signature are present. For 14 CFR parts 91K, 121, 125, and 135, an electronic signature process is a requirement of Operations Specification (OpSpec) A025, Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manual Systems. The following guidelines apply to a certificate holder's electronic signature process:

2.2.1 Signature Uniqueness. The electronic signature process ensures the uniqueness of the signature, which is difficult to duplicate.

2.2.2 A Means to Convey the Intent to Sign. The electronic signature process prompts the signer before their signature is affixed. The electronic signature block should contain a word or statement of intent that definitively conveys the signer's intent to affix their signature. Examples of statements that do this include, but are not limited to:

- "Signed by,"
- "Certified by,"
- "Instructor's signature/certification,"
- "Signature,"

- "Authorized by,"
- "Signatory,"
- "Authentication,"
- "Acknowledged by,"
- "Acknowledgement," and/or
- "Affirmed by."

2.2.3 Notification of Signed Record or Document. The electronic signature process notifies the signer that the signature has been affixed.

2.2.4 Scope of Information. The electronic signature process clearly identifies the information being attested to by the signature.

2.2.4.1 The electronic signature process provides the signer with an opportunity to review the record before signing it.

2.2.4.2 The electronic signature process ensures the signer's electronic signature is applied only to what the signer is able to review.

2.2.5 Nonrepudiation. The electronic signature process ensures the signer cannot deny having affixed the signature to a specific record, document, or body of data.

2.2.6 Security Protocols and Controlled Access. The electronic signature process contains security protocols and prevents unauthorized access to the system that affixes the signature to the intended documents or records. The electronic signature process should:

2.2.6.1 Ensure control of private keys and access codes. The process should ensure that the private key (for digital electronic signatures), or access to the electronic system that affixes the signature, is under the sole custody of the signer at all times.

2.2.6.2 Ensure that only the intended signer can affix their signature and prevent unauthorized individuals from certifying documents.

2.2.6.3 Prevent modifications to information/data and/or prevent the addition of entries to records or documents without requiring a new signature.

2.2.6.4 Contain restrictions and procedures to prohibit the use of an individual's electronic signature when the individual leaves or terminates employment.

2.2.7 Electronic Signatures are Permanent and Unalterable. The electronic signature process ensures that each signature is a permanently affixed to the document or record in its original form and content at the time it was signed. Users should not be able to edit the contents of the document or record once the signer affixes their signature.

2.2.8 Ability to Make Corrections to Signed Documents. The electronic signature process includes a means for a certificate holder to correct records or documents that were either electronically signed in error or were signed correctly but the information or data is in error. An electronic signature should be invalidated any time a superseding entry is made to correct the record or document.

2.2.9 Archivable. The electronic signature process has a secure means of archiving electronically signed documents.

2.2.10 Information Technology (IT) System Support. The electronic signature process includes IT system support for any hardware, software, or network that is part of the electronic signature process.

2.2.11 Policies and Procedures. The electronic signature process should include policies and procedures that address the key elements of an electronic signature and follow the guidelines contained in this chapter. The policies and procedures should be documented in the certificate holder's manual system, and should include the following:

2.2.11.1 Regulatory Compliance. Policies and procedures should address how the electronic signature process ensures compliance with 14 CFR regulatory requirements as they apply to records and documents that require a signature.

2.2.11.2 Description of Electronic Signature Process. Policies and procedures should include a description of the electronic signature process.

2.2.11.2.1 OpSpec A025 requires each electronic signature process to be listed in the appropriate table of the OpSpec. A025 also requires the listing of the manual that contains the description of the electronic signature process. For those certificate holders who are not required to have manuals (e.g., 14 CFR part 135 single-pilot operators), a standalone electronic signature process document is an acceptable alternative, provided it is in an official document maintained by the certificate holder.

2.2.11.2.2 The description of the electronic signature process should explain how electronic signatures will be used and how electronic signatures are applied throughout the certificate holder's operation (e.g., dispatch releases, training records, airworthiness releases, and maintenance actions).

2.2.11.2.3 The electronic signature process description should include the hardware, software, and network applications.

2.2.11.3 Responsible Personnel. Policies and procedures should identify the certificate holder's personnel who have the authority and overall responsibility for both the electronic signature process and for controlling access to the computer software/application used in the process.

2.2.11.4 Defined Users. Policies and procedures should identify the authorized users of the electronic signature process. This includes identifying each user's role

in the process, along with the records or documents each user is authorized to sign electronically.

2.2.11.5 Quality Control (QC) and Auditing. Policies and procedures should include QC and auditing measures that ensure that all of the key elements of electronic signatures are present and follow the guidelines contained in this AC.

2.2.11.6 How Changes to the Electronic Signature Process Changes Will Be Submitted to the FAA. Policies and procedures should address how the certificate holder will submit changes to the electronic signature process to the FAA for acceptance.

2.2.12 Training and User Instructions. The electronic signature process should include any training and instructions necessary to ensure that authorized users understand how to apply the electronic signature process.

2.3 Electronic Signature Authorization.

2.3.1 Submit an Application. Certificate holders will submit their application to use an electronic signature process to the responsible Flight Standards office in writing. The FAA will review the application package for accuracy and completeness and notify the certificate holder in writing of any deficiencies. Before the responsible Flight Standards office accepts the application package, the certificate holder will be required to correct all of the deficiencies. A certificate holder's application package for authorization to use electronic signatures should include the following:

2.3.1.1 Letter of Intent. The application should contain the certificate holder's Letter of Intent to use electronic signatures.

2.3.1.1.1 Estimated Date of Implementation. The letter should include the estimated date on which the certificate holder would like to begin using electronic signatures.

2.3.1.1.2 Primary Point of Contact (POC). The letter should include the certificate holder's primary POC for the electronic signature process application.

2.3.1.2 The Documents and/or Records That Will Contain an Electronic Signature. The application should state specifically which documents or records the certificate holder desires to contain an electronic signature.

2.3.1.3 Manual Containing the Electronic Signature Process. The certificate holder should include a copy of the manual(s) (or document, for operations that do not require a manual) that contains the electronic signature process, its description, and the associated policies and procedures that address the key elements and guidelines described in paragraphs 2.1 and 2.2 above. For 14 CFR parts 91K, 121, 125, and 135, OpSpec A025 requires the manual (or document) to be listed in the OpSpec. Therefore, the FAA will not accept an

application package that does not include this manual for those regulatory parts.

2.3.2 Demonstration Phase. The FAA will require a certificate holder to demonstrate the electronic signature process. The items requiring demonstration will typically include at least the following:

2.3.2.1 How an Electronic Signature is Accomplished. The demonstration should show how an electronic signature is actually accomplished for each type of document or record for which a certificate holder desires to use an electronic signature.

2.3.2.2 Security Protocols and Prevention of Unauthorized Access and Modification. The certificate holder should demonstrate the following:

1. How the electronic signature process prevents unauthorized personnel from signing a document or record.
2. How the process prevents anybody other than the intended signer to affix their signature.
3. How modifications to a signed document or record are prevented without a new signature.
4. How the signature is permanently affixed to the document or record being signed.

2.3.2.3 QC Procedures. The certificate holder should demonstrate their QC procedures for ensuring the security and authenticity of electronic signatures.

2.3.3 Successful Completion of Application Process for Acceptance and Authorization. When a certificate holder successfully completes the application and demonstration process, the FAA will accept the electronic signature process and authorize its use by signing and issuing OpSpec A025.

2.3.4 Unsuccessful Application. If the certificate holder fails to submit an acceptable application or fails to successfully demonstrate the electronic signature process, the responsible Flight Standards office will reject the application and provide an explanation to the certificate holder in writing.

CHAPTER 3. ELECTRONIC RECORDKEEPING

3.1 Electronic Records. An electronic record should provide equivalent or better data integrity, accuracy, and accessibility to what would otherwise be provided by a paper record. In general, a record preserves the evidence of an event. It should contain enough information to clearly depict the event that took place. It is the certificate holder's responsibility to address all 14 CFR requirements for their recordkeeping system(s) applicable to their operation(s).

3.1.1 Key Elements of an Electronic Record. The following key elements comprise a complete and valid electronic record:

3.1.1.1 The type of event that took place (e.g., training, maintenance performed, signing of a release, conduct of a flight, etc.).

3.1.1.2 For a training event, the information that shows compliance with regulatory requirements, such as the name of the course module or subject, the number of hours of instruction, whether the student passed or failed, etc.

3.1.1.3 When the event took place (e.g., the date and time).

3.1.1.4 Where the event took place (e.g., the station, training facility, maintenance facility, etc.).

3.1.1.5 Who was involved in the event (e.g., crewmembers, dispatchers, instructors, mechanics, etc.).

3.1.1.6 Aircraft type and registration number for pilot logbook records (when required by regulation).

3.1.1.7 Certification, verification, or authentication of the event, such as a signature, where required by regulation.

1. The record contains certification, verification, and/or authentication of the event (e.g., a signature), where required by regulation.
2. Where certification, verification, and/or authentication are required, authorization to use an electronic signature is also required.

3.1.1.8 Aircraft information, including each aircraft, airframe, engine, propeller, appliance, component, or part make and model (M/M) for maintenance records, as required by regulation.

3.1.1.9 Other items required by regulation. The record contains all other items required by the regulation mandating the record.

3.2 Electronic Recordkeeping Systems. The following guidelines apply to each electronic recordkeeping system used by certificate holders:

3.2.1 Controlled Access. The electronic recordkeeping system contains safeguards against uncontrolled access.

3.2.2 Record Preservation. The electronic recordkeeping system ensures that each record is preserved and unalterable without the appropriate certification, verification, and/or authentication.

3.2.3 Protection of Confidential Information. The electronic recordkeeping system protects confidential information.

3.2.4 Prevention of Data Corruption. The electronic recordkeeping system prevents data corruption.

3.2.5 Information Technology (IT) System Support. The electronic recordkeeping system has IT support that includes hardware, network, and software applications and contains provisions for system outages and protects against the loss of record data.

3.2.6 Software Revision Control. The electronic recordkeeping system includes a process for revision control that monitors and tracks software revisions and how they affect the overall system and the records maintained on the system. This is a requirement of Operations Specification (OpSpec) A025, Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manual Systems, for 14 CFR parts 91K, 121, 125, and 135. The approved process will be included in the certificate holder's manual containing the electronic recordkeeping system description, which is required to be listed in the appropriate table of A025.

3.2.6.1 The revision control process is included in the certificate holder's manual containing the electronic recordkeeping system description, which is required to be listed in the appropriate table of A025.

3.2.6.2 The revision control process includes certificate holder notification to the responsible Flight Standards office whenever software revisions affect the following items:

- Record entry.
- Record display.
- Record access.
- Data quality.

3.2.7 Backup Measures. The electronic recordkeeping system includes backup measures to maintain and provide access to records in the event of a system failure. The backup measures provide a record equivalent to that which would be entered and/or otherwise maintained on the primary system. Examples of backup methods include, but are not limited to:

- A separate electronic system,
- A backup server,
- External drives, and
- Printed records.

3.2.8 Policies and Procedures. Certificate holders with electronic recordkeeping systems should have policies and procedures that address the key elements and guidelines listed in this chapter. The policies and procedures should be documented in the certificate holder's manual system. For those certificate holders who are not required to have manuals (e.g., 14 CFR part 135 single-pilot operators), a standalone electronic recordkeeping system procedures document is an acceptable alternative, provided it is an official document maintained by the certificate holder. Policies and procedures should include at least the following:

3.2.8.1 Regulatory Compliance. Policies and procedures should address how the electronic recordkeeping system ensures compliance with the 14 CFR regulatory requirements as they apply to records.

3.2.8.2 Description of Electronic Recordkeeping System(s). Policies and procedures should include a description of the electronic recordkeeping system, including how it meets the guidelines contained in this chapter. For 14 CFR parts 91K, 121, 125, and 135, OpSpec A025 requires the manual containing the description of the electronic recordkeeping system to be listed in the OpSpec. For those certificate holders who are not required to have a manual, a standalone electronic recordkeeping system procedures document is an acceptable alternative, provided it is an official document maintained by the certificate holder. Each electronic recordkeeping system description should address the key elements and guidelines contained in paragraphs 3.1, 3.1.1, and 3.2 above, as well as the following:

3.2.8.2.1 The description of each electronic recordkeeping system should include the hardware, software, and network applications.

3.2.8.2.2 The description of the electronic recordkeeping system should include clear descriptions of each electronic recordkeeping system utilized by the certificate holder.

3.2.8.2.3 The description of the electronic recordkeeping system should identify the records maintained and stored on the system. Where more than one system is used, the description should specify the kind of record(s) maintained on each system.

3.2.8.2.4 The description of the electronic recordkeeping system should include the software revision control process as outlined in paragraph 3.2.6 above.

3.2.8.2.5 The description of the electronic recordkeeping system should identify the electronic records for which the certificate holder will use an authorized electronic signature process.

3.2.8.3 **Responsible Personnel.** Policies and procedures should identify the certificate holder's personnel who have the authority and overall responsibility for the electronic recordkeeping system and have overall responsibility for controlling access to network, computer, and software applications.

3.2.8.4 **Defined Users.** Policies and procedures should identify the authorized users of the electronic recordkeeping system. This includes identifying each user's role.

3.2.8.5 **Quality Control (QC) and Auditing.** Policies and procedures should include QC and auditing measures that ensure all guidelines for the electronic recordkeeping system, including system backup measures, continue to be met.

3.2.8.5.1 QC and auditing should be accomplished at regular intervals (e.g., semiannually, biannually, or annually).

3.2.8.5.2 QC and auditing should apply to any backup method or system.

3.2.8.5.3 QC and auditing should include verifying the continued accuracy of records maintained on the system.

3.2.8.5.4 Personnel responsible for accomplishing QC and auditing should be identified.

3.2.8.6 **Procedures for Making Required Records Available to FAA and National Transportation Safety Board (NTSB) Personnel.** Policies and procedures should address making records available to the FAA and NTSB. Regulations require certificate holders to provide records in accordance with 14 CFR § 119.59 and Title 49 of the Code of Federal Regulations (49 CFR) § 830.1. While neither regulation stipulates the format in which records are to be provided, records should be provided in a manner that is acceptable to the requesting agency. FAA personnel assigned to a certificate holder with an electronic recordkeeping system may request a certificate holder to provide direct access to the electronic recordkeeping system for the purpose of inspecting regulatory records maintained on the system and listed in OpSpec A025. While providing the FAA direct access to electronic recordkeeping system is voluntary, providing the records themselves is mandatory.

3.2.8.7 **Instructor and Evaluator Access and Certifications.** Policies and procedures should address access by regulatory personnel (e.g., instructors, check pilots, check flight engineers (FE), aircraft dispatcher supervisors, and

flight attendant (F/A) supervisors) to electronically enter record information and certify all record entries for which they are responsible.

3.2.8.8 Electronic Authentication, Certification, Signature, Validation, or Endorsement. Policies and procedures should specify and ensure that the certificate holder is authorized in OpSpec A025 to use an electronic signature process whenever electronic records require validation, such as a signature, certification, endorsement, or authentication.

3.2.8.9 Transferring Data to Another System. Should technological advances make it desirable or necessary for a certificate holder to update their electronic recordkeeping system or transfer data to a new system, policies and procedures should ensure the continued integrity of record data when a certificate holder moves records from one system to another. This could entail running redundant systems for a brief period of time.

3.2.8.10 Continuity of Data Between Legacy and Electronic Systems. Policies and procedures should ensure continuity of data during transition from a legacy (hardcopy) system to an electronic system.

3.2.8.11 Continuity of Records for Maintenance Providers. Policies and procedures should ensure continuity of record data utilized and maintained by maintenance providers.

3.2.8.12 Maintenance Record Transfer. Policies and procedures should ensure that electronic maintenance records transferred with an aircraft meet the regulatory requirements for record transfer (refer to 14 CFR §§ 43.10, 91.419, 121.380a, and 135.441).

3.2.8.13 Changes to the Electronic Recordkeeping System. Policies and procedures should include details of when revisions to the electronic recordkeeping system (including new versions of system software) will be submitted to the FAA for approval or acceptance (depending on the regulatory requirement) prior to implementation.

3.2.9 Training and User Instructions. The electronic recordkeeping system should include any training and instructions that are necessary to ensure authorized users understand how to use the system.

3.3 Electronic Recordkeeping Authorization.

3.3.1 Submit an Application. Certificate holders will submit their application for an electronic recordkeeping process to the responsible Flight Standards office in writing. The FAA will review the application package for accuracy and completeness and notify the certificate holder in writing of any application deficiencies. Before the responsible Flight Standards office accepts the application package, the certificate holder will be required to correct all of the deficiencies. A certificate holder's application package for authorization to use an electronic recordkeeping system should include the following:

3.3.1.1 Letter of Intent. The application should contain the certificate holder's Letter of Intent to use an electronic recordkeeping system.

3.3.1.1.1 The Name of the Electronic System(s). The letter should include the kinds of records along with the name of the electronic system to be used to maintain the records. There may be more than one system required to maintain various kinds of records.

3.3.1.1.2 Estimated Date of Implementation. The letter should include the estimated date on which the certificate holder would like to implement the electronic recordkeeping system.

3.3.1.1.3 Primary Point of Contact (POC). The letter should include the certificate holder's primary POC for the electronic recordkeeping system application process.

3.3.1.2 The Manual Containing the Policies, Procedures, and Description of the Electronic Recordkeeping System. The application should include the manual(s) (or document for operations that do not require a manual) that contains the electronic recordkeeping system policies, procedures, and description as outlined in paragraph 3.2 above. For 14 CFR parts 91K, 121, 125, 133, and 135, OpSpec A025 requires the manual (or document) to be listed in the OpSpec. Therefore, the FAA will not accept an application package that does not include this manual for those regulatory parts.

3.3.1.3 The Records That Will Be Maintained in the System. The application should state specifically which records the certificate holder intends to maintain and access via the electronic recordkeeping system. The application should include a sample of each record type.

3.3.1.4 The Software Revision Control Process. The application should include the certificate holder's proposed electronic recordkeeping system software revision control process.

3.3.1.5 The Data Backup. The application should describe the details of the certificate holder's data backup system.

3.3.1.6 Electronic Signature Processes Used in the Electronic Recordkeeping System. The application should include a description of any electronic signature process associated with each electronic record category.

3.3.2 Demonstration Phase. The FAA will require a certificate holder to demonstrate the electronic recordkeeping system. The items requiring demonstration will typically include at least the following:

3.3.2.1 Record Entry. The certificate holder should demonstrate how a record is entered into the system.

3.3.2.2 Security Protocols. The demonstration should include the following security and prevention protocols:

1. How the electronic recordkeeping system process prevents unauthorized access.
2. How the electronic recordkeeping system prevents unauthorized changes/modifications to records.
3. For electronic records that require authentication, signature, validation, or endorsement, how modifications to a record are prevented without a new authentication, signature, validation, or endorsement.

3.3.2.3 QC Procedures. The certificate holder should demonstrate how the QC and auditing procedures work.

3.3.3 Successful Completion of Application Process for Approval or Acceptance and Authorization. When the certificate holder successfully completes the application and demonstration process, the FAA will accept or approve (depending on the regulatory requirement) the electronic recordkeeping system and authorize their use by signing and issuing OpSpec A025.

3.3.4 Unsuccessful Application. If the certificate holder fails to submit an acceptable application or fails to successfully demonstrate the electronic recordkeeping process, the responsible Flight Standards office will reject the application and provide an explanation to the certificate holder in writing.

CHAPTER 4. ELECTRONIC MANUAL SYSTEMS

4.1 Electronic Manuals. Electronic manuals may consist of accepted or approved data and/or reference data used in aircraft maintenance or operations.

4.1.1 Provides Necessary Instructions. An electronic manual should provide instructions and information necessary to allow concerned personnel to perform their duties and responsibilities with a high degree of safety.

4.1.2 Provides Equivalent Data. An electronic manual should provide equivalent or better data integrity, accuracy, and accessibility to what would otherwise be provided by a printed manual.

4.1.3 Provides Clearly Identifiable Content. The content of each electronic manual should be clearly identifiable and viewable by the user and should correlate and be comparable to what would be available in a printed version of the manual.

4.1.4 Elements That Generally Comprise a Manual. An electronic manual should contain elements that generally comprise a printed manual. These elements typically include:

1. The manual title;
2. Revision control pages or sections from which the user can readily determine whether the manual is current;
3. List of effective pages;
4. Indication of FAA approval (e.g., signature or stamp) for those manuals or manual sections that require FAA approval;
5. Chapter numbers;
6. Chapter headings;
7. Section numbers;
8. Topic headings;
9. Page numbers;
10. Applicable aircraft, airframe, engine, propeller, appliance, component, or part make and model (M/M) (when applicable for minimum equipment list (MEL) and maintenance purposes); and
11. The person with the authority and responsibility for manual content.

4.2 Special Considerations in Displaying Information. Information retrieved from an electronic manual could be displayed in a format that differs from what would appear on paper. The display format could even vary by user. For example, the display of manual content could be different for pilots on the flight deck of an aircraft versus what is displayed to ground personnel at a computer workstation. This could occur for reasons such as screen resolution, software application, or an authorized display device. Information displayed on any authorized device on the flight deck should correlate to

information displayed at an authorized computer workstation or authorized portable device. Additionally, any information displayed should be easily traceable and comparable to the source document. The most important point is that the electronic manual content remains the same, regardless of the display format or device. Any displayed manual information should be identical in content for all users.

4.3 Electronic Manual Systems. An electronic system for delivering manual content must comply with regulatory requirements for currency, availability, accessibility, and distribution to the appropriate personnel. These requirements are set forth in 14 CFR § 91.1023, part 121 subpart G, part 125 subpart C, and § 135.21. Similar requirements are also contained in 14 CFR § 145.207. The following guidelines apply to electronic manual systems:

4.3.1 Ensures Manual Currency. The electronic manual system has a method of ensuring that each person (refer to 14 CFR part 1 for definition of "person"), to whom a manual or appropriate parts of it are furnished, keeps it up to date.

4.3.2 Provides Access, Availability, and Distribution to the Appropriate Personnel. The electronic manual system distributes, furnishes, and/or provides access to manual(s) by the appropriate personnel.

4.3.3 Access is Controlled. Access to the electronic manual system is controlled.

4.3.4 Electronic Access to the MEL—14 CFR Parts 91K, 121, 125, and 135. Where electronic MELs are concerned, there are additional regulatory requirements. Title 14 CFR §§ 91.1115(a)(2), 121.628(a)(2), 125.201(a)(2), and 135.179(a)(2) require certificate holders who conduct operations under 14 CFR part 91K, 121, 125, or 135 to provide flightcrews with direct access to the MEL through printed or other means approved by the Administrator. Electronic access to an MEL falls under the category of "other means approved by the Administrator." Therefore, the use of an electronic MEL will require FAA approval in addition to FAA acceptance of the electronic manual system. Certificate holders that desire FAA approval to provide electronic access to their MEL will list each electronic MEL in the master manual or document that describes the electronic manual system. The master manual or document is discussed later in this chapter. Operations Specification (OpSpec) A025, Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manual Systems, requires each electronic MEL to be listed by aircraft M/M or make, model, and series (M/M/S), as specified by the MEL.

4.3.5 FAA Access—14 CFR Parts 91K, 121, 125, and 135. For 14 CFR parts 91K, 121, 125, and 135, each certificate holder must furnish copies of their manuals to appropriate FAA personnel. The FAA encourages certificate holders to provide access to the electronic manual system to the appropriate FAA representatives assigned to the certificate holder. When providing such access, a certificate holder should provide the FAA's representatives with instructions on how to access the system.

4.3.6 Functionality. The electronic manual system provides for storage and retrieval of electronic manual content and allows manual users to easily access manual content via

computer or comparable device. When appropriate or necessary, manual users should be able to print any information contained in an electronic manual. Once printed, however, content from an electronic manual could be less current than what is maintained on the electronic manual system.

4.3.7 Manual Revision Control. The electronic manual system provides revision control.

4.3.7.1 **Manuals are Easy to Revise.** Each manual distributed, furnished, or provided by the electronic manual system should be in a form that is easy to revise. For 14 CFR parts 91K, 121, 125, and 135, this is required.

4.3.7.2 **Revision Status.** Each manual accessed via the electronic manual system for 14 CFR parts 91K, 121, 125, and 135 must display the date of the last revision in a manner in which a person can immediately ascertain it (refer to 14 CFR §§ 91.1025, 121.135, 125.73, and 135.23). The intent is that the date of the last revision is readily accessible in the manual being used and that employees are able to quickly determine that they are using the most current version of the manual (refer to 88 FR 34437, Updating Manual Requirements to Accommodate Technology, dated May 30, 2023). The following are examples of how revision information could be displayed in an electronic manual:

4.3.7.2.1 Revision Status by Page. Electronic manuals that have individual pages should display the date of the latest revision for each particular page.

4.3.7.2.2 Revision Status Contained in Blocks of Information. Electronic manuals displayed in a continuous flow format, as opposed to page-by-page, should display the date of the latest revision in each section or block of information.

4.3.7.2.3 Revision Control Pages. Electronic manuals should contain a revision control page or section from which the user can readily determine whether the manual is current.

4.3.7.3 **Communication of Revision Information.** The electronic manual system should include a method of communicating revision information to manual users.

4.3.7.3.1 Revision information should provide the revision content, effective date, and any instructions required for ensuring that the revision is uploaded or incorporated into the electronic manual.

4.3.7.3.2 Revision information should allow the user the ability to compare the current revision to the previous version or it should explain the effect of the change.

4.3.7.3.3 Revised content should be readily apparent to the user.

4.3.7.3.4 Each electronic manual should contain a revision control page or section from which the user can readily determine whether the manual is current.

4.3.8 Data Archiving. The electronic manual system has a method of archiving technical and procedural data superseded by revision. Earlier versions of manuals are archived and preserved to provide for future needs to duplicate, regenerate, or reconstruct instructions.

4.3.8.1 The Importance of Historical Data. Archived historical data is particularly important for the following reasons:

1. To trace aircraft repair information or reconstructing maintenance instructions.
2. To evaluate normal and abnormal flight deck (cockpit) checklist procedures.
3. For training purposes.
4. For investigation purposes in the event of an accident, incident, or occurrence.

4.3.9 Transferring Data to Another System. Technological hardware or software advances could make it desirable and/or necessary for a certificate holder to update their electronic manual system. When transferring manual data from one electronic system or application to another, the electronic manual system ensures that data integrity is maintained during transfer. This includes ensuring that archived information remains intact. This could entail running redundant systems for a brief period of time.

4.3.10 Information Technology (IT) System Maintenance and Support. The electronic manual system includes maintenance and support that can identify and resolve hardware, software, and network issues.

4.3.11 Backup Method. The electronic manual system has a backup method of maintaining, distributing, or otherwise providing access to manuals in case of system hardware, software, or network failure. The backup method may be a separate electronic system, a backup server to the authorized system, the use of backup media such as print or CD-ROM, or other methods acceptable to the FAA.

4.3.12 Master Manual for 14 CFR Parts 91K, 121, 125, and 135. The electronic manual system has a master manual. OpSpec A025 requires an electronic manual system used in operations under 14 CFR parts 91K, 121, 125, and 135 to include a master manual that describes the electronic manual system, contains the policies and procedures applicable to the electronic manuals system, and lists each manual maintained and distributed via the system. A025 requires the name of the master manual to be listed in the appropriate table of the OpSpec. (A 14 CFR part 135 certificate holder authorized by OpSpec A040 to be a single-pilot operator, who elects to have a manual and maintain/distribute it electronically, may list that manual as being the master manual for the purposes of OpSpec A025.)

4.3.13 Certificate Holders with Large and Complex Manual Systems. For a certificate holder with a large and complex manual system that contains numerous manuals, it is acceptable to list the kinds of manuals in the master manual, instead of listing each manual, provided

all of the particular kinds of manuals are maintained and distributed via the electronic manual system. For example, list "All Ground Operations Manuals," "All Maintenance Manuals," or "All Training Program Manuals."

4.3.14 Description of the Electronic Manual—14 CFR Parts 133 and 145. For electronic manuals used in 14 CFR parts 133 and 145, a description of how each electronic manual is displayed, maintained, revised, and distributed should be included in the certificate holder's manual system. The description should also include an explanation of the media by which manuals will be distributed to required personnel.

4.3.15 Policies and Procedures. Certificate holders with electronic manual systems should have policies and procedures that address the guidelines listed in this chapter. Policies and procedures should be documented in the certificate holder's manual system. For 14 CFR parts 91K, 121, 125, and 135, documentation should be included in the master manual.

4.3.15.1 A Description of the Electronic Manual System. Policies and procedures should include a description of the electronic manual system. The description should include the methods for distribution and/or access to manual(s), including revision control.

4.3.15.2 Delivery Media. Policies and procedures should include an explanation of the media by which the manuals will be distributed to required personnel.

4.3.15.3 Personnel With Authority and Responsibility. Policies and procedures should list the certificate holder's personnel who have the overall authority and responsibility for maintaining the electronic manual system.

4.3.15.4 Distribution of Electronic Manual Revisions to the FAA. Policies and procedures should include the certificate holder's method of distributing electronic revisions to the FAA. When a particular manual requires FAA approval or acceptance, procedures should explain how the certificate holder will submit an electronic revision to the FAA for approval or acceptance of the revised content.

4.3.15.5 Changes to the Electronic Manual System. Policies and procedures should address how the certificate holder will submit electronic manual system changes to the FAA for acceptance, prior to implementation. For 14 CFR parts 91K, 121, 125, and 135, changes to the electronic manual system will typically necessitate a revision to the master manual.

4.3.16 Quality Control (QC) and Auditing. Policies and procedures should include QC and auditing measures that ensure the guidelines for electronic manual systems, continue to be met.

4.3.17 User Instructions and Training. The electronic manual system should include training and instructions necessary to ensure authorized users understand how to use the system.

4.4 Electronic Manual Authorization.

4.4.1 Submit an Application. Certificate holders will submit their application for an electronic manual system to the responsible Flight Standards office in writing. The FAA will review the application package for accuracy and completeness and notify the certificate holder in writing of any application deficiencies. Before the responsible Flight Standards office accepts the application package, the certificate holder will be required to correct all of the deficiencies. A certificate holder's application package for authorization to use an electronic manual or manual system should include the following:

4.4.1.1 Letter of Intent. The application should contain the certificate holder's Letter of Intent to use an electronic manual system.

4.4.1.1.1 Estimated Date of Implementation. The letter should include the estimated date on which the certificate holder would like to implement the electronic manual system.

4.4.1.1.2 Primary Point of Contact (POC). The letter should include the certificate holder's primary POC for the electronic manual system application process.

4.4.1.2 The Master Manual for 14 CFR Part 91K, 121, 125, or 135. An application to use an electronic manual system for 14 CFR part 91K, 121, 125, or 135 should include a copy of the master manual as described in paragraph 4.3 above. The manual is required by OpSpec A025 and should address the guidelines set forth in this AC, contain policies and procedures, and list each manual maintained and distributed by the electronic manual system. The FAA will not accept an application that does not include the master manual.

4.4.1.3 A Description of the Electronic Manual—14 CFR Parts 133 and 145. An application to use an electronic manual for 14 CFR parts 133 and 145 should include a description of the electronic manual as described in paragraph 4.3 above.

4.4.1.4 Manuals Included in the System. The application should state specifically which manuals the certificate holder intends to maintain and distribute electronically. All of the applicable manuals should be included. For example:

- Flight Operations Manuals (FOM) by title;
- Ground operations manuals by title;
- Maintenance manuals by title;
- Training program manuals by title;
- Electronic MELs;

- General policy manuals by title; and
- User manuals (e.g., flight planning system and other hardware/software applications) by title.

4.4.1.5 How Electronic Manuals Will Be Provided to the FAA. The application should explain how electronic manuals will be furnished/provided to the responsible Flight Standards office, including an explanation of how revisions and future electronic manuals will be provided.

4.4.1.6 Electronic Access to an MEL. Title 14 CFR parts 91K, 121, 125, and 135 require a certificate holder or program manager to have FAA approval and OpSpec authority to provide access to an MEL via electronic means. Certificate holders desiring to provide electronic access to an MEL must specify that in the application and include details on how electronic access will be provided.

4.4.2 Demonstration Phase. The FAA will require a certificate holder to demonstrate the electronic manual system. The items requiring demonstration will typically include at least the following:

4.4.2.1 System Functionality. The certificate holder should demonstrate how the electronic manual system works. Specifically, the demonstration should show how manuals are accessed. If access is different for certain users, the demonstration should include how information is accessed by each group.

4.4.2.2 Revision Status. For electronic manuals used in 14 CFR parts 91K, 121, 125, and 135 operations, the demonstration should show how each electronic manual displays the date of latest revision in a manner in which a person can immediately ascertain it (see paragraph 4.3.7 above). Additionally, the demonstration should show how revisions are posted to electronic manuals.

4.4.2.3 Security Protocols. The demonstration should include how the system prevents unauthorized access and/or unauthorized modifications to manual content.

4.4.2.4 QC Procedures. The demonstration should show how the QC and auditing procedures work.

4.4.3 Successful Completion of Application for Approval or Acceptance and Authorization. When a certificate holder successfully completes the approval (applicable only to electronic access to an MEL) or acceptance process, the FAA will authorize the electronic manual system by signing and issuing OpSpec A025.

4.4.4 Unsuccessful Application. If the certificate holder fails to submit an acceptable application or fails to successfully demonstrate the manual system process, the responsible Flight Standards office will reject the application and provide an explanation to the certificate holder in writing.

CHAPTER 5. VOLUNTARY DISCONTINUANCE BY CERTIFICATE HOLDER

5.1 Voluntary Discontinuance. If a certificate holder elects to discontinue using electronic signatures, an electronic recordkeeping system, or an electronic manual system, they will inform the responsible Flight Standards office in writing. Once informed, the responsible Flight Standards office will amend the certificate holder's Operations Specification (OpSpec) A025, Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manual Systems, to remove the authorization voluntarily discontinued. Certificate holders that voluntarily discontinue the use of electronic signatures, an electronic recordkeeping system, and/or an electronic manual system should include the following information in their discontinuance letter.

5.1.1 Letter of Discontinuance for Electronic Signatures.

5.1.1.1 The letter from the certificate holder should include the projected date the certificate holder intends to discontinue using the electronic signatures.

5.1.1.2 The letter should contain a description of how the certificate holder intends to transition from using electronic signatures to using pen-and-ink signatures.

5.1.1.3 The letter should contain a description of how electronically signed documents and records will be reproduced and retained in accordance with the requirements of 14 CFR in hardcopy form.

5.1.1.4 If an electronic signature is used in conjunction with an electronic recordkeeping system, the FAA will likely initiate procedures to withdraw authority to use the electronic recordkeeping system.

5.1.2 Letter of Discontinuance for an Electronic Recordkeeping System.

5.1.2.1 The letter from the certificate holder should include the projected date the certificate holder intends to discontinue using the electronic recordkeeping system.

5.1.2.2 The letter should contain a description of how the certificate holder intends to transition from electronic records to paper records. The description should include how the certificate holder intends to ensure the content of the paper records match the electronic content, including having the required signatures.

5.1.2.3 The letter should include the estimated date the paper records will be ready for FAA review.

5.1.3 Letter of Discontinuance for an Electronic Manual System.

5.1.3.1 The letter from the certificate holder should include the projected date the certificate holder intends to discontinue using the system and provide hardcopy manuals, if required by appropriate 14 CFR parts.

5.1.3.2 The letter should contain a description of how the certificate holder intends to transition from electronic manuals to paper manuals. The transition description should include procedures for the certificate holder to audit the paper manuals by comparing them to the electronic manuals and reconcile any differences.

5.1.3.3 The letter should include the estimated date the hardcopy manuals will be provided to the responsible Flight Standards office.

CHAPTER 6. ADMINISTRATIVE

6.1 Questions About This Advisory Circular (AC). If you have questions about the material in this AC or would like to provide feedback, you may contact:

- The Air Transportation Division at Room # 834, 800 Independence Avenue, SW, Washington DC, 20591, or by phone at 202-267-8166; and/or
- The Aircraft Maintenance Division at 8th Floor, 800 Independence Avenue, SW, Washington, DC 20591, or by phone at 202-267-1675.

6.2 AC Feedback Form. For your convenience, the AC Feedback Form is the last page of this AC. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this AC on the Feedback Form.

6.3 Other Related Regulations, Guidance, and Reading Material (current editions).

6.3.1 Regulatory References:

- Public Law (PL) 104-13, Paperwork Reduction Act of 1995.
- PL 105-277, Title XVII, Government Paperwork Elimination Act.
- PL 106-229, Electronic Signatures in Global and National Commerce Act (E-Sign Act).
- Title 14 CFR Parts 43, 61, 65, 91, 119, 121, 125, 129, 133, 135, 137, 141, 142, 145, and 147.
- Office of Management and Budget (OMB) Circular A-130, Managing Information as a Strategic Resource.

6.3.2 FAA Order 8900.1, Flight Standards Information Management System. Certificate holders can find Order 8900.1 on the Dynamic Regulatory System (DRS) at https://drs.faa.gov.

6.3.2.1 Title 14 CFR Part 121 Dispatch and Flight Release Requirements—Electronic Signatures, Amendments, and Disposition. Information regarding electronic signatures on a dispatch or flight release, electronic amendments to a dispatch or flight release, and/or electronic recordkeeping of a dispatch or flight release is contained in Volume 3, Chapter 25, Section 1, Basic Requirements and Policy Applicable to All Air Carriers.

6.3.2.2 Title 14 CFR Part 121 En Route Communication Records. Information on the electronic retention of en route communication records in accordance with 14 CFR § 121.711 is contained in Volume 3, Chapter 25, Section 1.

6.3.2.3 Title 14 CFR Parts 121 and 135 Recordkeeping Systems Acceptance or Approval Process. Information and guidance to be used by PIs when accepting or approving certificate holder recordkeeping systems is contained

in Volume 3, Chapter 31, Section 2, Requirements for Approval, Acceptance, and Authorization.

6.3.2.4 Title 14 CFR Parts 121 and 135 Crewmember and Aircraft Dispatcher Records. Volume 3, Chapter 31, Section 3, Crewmember and Aircraft Dispatcher Records, contains detailed information regarding crewmember and aircraft dispatcher records in accordance with the requirements of 14 CFR parts 121 and 135, as applicable.

6.3.2.5 Title 14 CFR Part 121 and § 135.411(a)(2) Maintenance Records. Volume 20, Chapter 7, Maintenance Recordkeeping System, contains detailed information regarding the evaluation of an air carrier's maintenance recordkeeping system.

6.3.2.6 Title 14 CFR Part 91K Non-Continuous Airworthiness Maintenance Program (CAMP) Program Manager's, 14 CFR § 125.247 Certificate Holder's, and 14 CFR § 135.411(a)(1) Maintenance Records. Volume 3, Chapter 31, Section 6, Evaluate an Owner's or Operator's Maintenance Records as Required by § 91.417, contains information for Airworthiness inspectors on how to evaluate 14 CFR part 91K non-CAMP and 14 CFR part 135 maintenance records.

6.3.2.7 Title 14 CFR Part 145. Volume 6, Chapter 9, Section 6, Inspect a Repair Station's Record System, contains information on repair station recordkeeping.

6.3.2.8 Operations Specification (OpSpec) A025, Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manual Systems. Information on how to issue OpSpec A025 is contained in Volume 3, Chapter 18, Section 3, Part A Operations Specifications—General, OpSpec/MSpec/TSpec/LOA A025.

6.3.2.9 OpSpec A061, Electronic Flight Bag (EFB) Program. Information related to authorization to use an EFB program is contained in Volume 3, Chapter 18, Section 3, OpSpec/MSpec/LOA A061.

6.3.3 FAA Order 8000.79, Use of Electronic Technology and Storage of Data.

6.3.4 Related ACs:

- AC 90-117, Data Link Communications.
- AC 91-78, Use of Electronic Flight Bags.
- AC 91.21-1, Use of Portable Electronic Devices Aboard Aircraft.
- AC 120-64, Operational Use and Modification of Electronic Checklists.
- AC 120-76, Authorization for Use of Electronic Flight Bags.

6.3.5 Other Reading Material:

- OMB Memorandum M-00-15, OMB Guidance on Implementing the Electronic Signatures in Global and National Commerce Act.
- Federal Information Processing Standards (FIPS) Publication 186-5, Digital Signature Standard (DSS) at https://doi.org/10.6028/NIST.FIPS.186-5.

APPENDIX A. SAMPLE LETTER OF INTENT

Note: Certificate holders should use this AC to identify the various requirements for the Letter of Intent contents.

[Requester Letterhead]

To: [Responsible Flight Standards office]

From: [Requester]

Date: [Date]

Subject: Use of Electronic System – (Signatures/Recordkeeping/Manuals)

This letter is to inform you that [requester] intends to use an electronic (signatures and/or recordkeeping and/or manual) system for [describe what the system will be used for]. This system has been established using the guidelines outlined in FAA Advisory Circular (AC) 120-78 (as amended).

Company facilities, equipment, and personnel are available for your review at [address] on [date]. Please contact [name] at [telephone] to arrange a visit to review the system and to discuss any FAA concerns.

Sincerely,

[Requester]