



**NDT Training
Standards
Update: Advisory
Circulars 65-31,
25-29**

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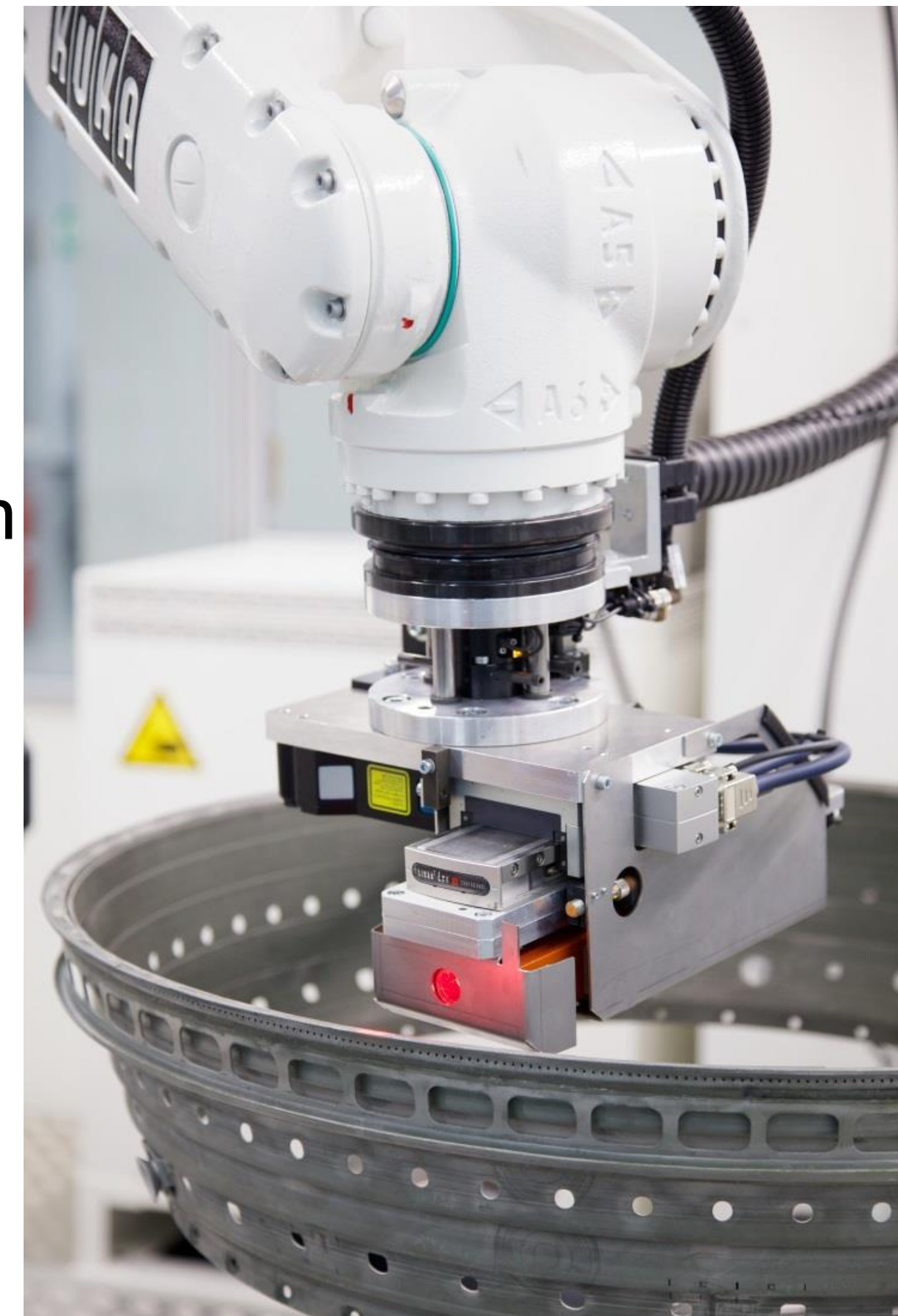
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Primary NDT Training Documents



- **Aerospace Sector**
 - ATA Spec 105 (Recommended Practice) Airline Oriented
 - NAS 410 / EN 4179 (Standard) Aerospace Industries Association
- **General Industry**
 - ASNT SNT-TC-1A (Recommended Practice)
 - ISO 9712 (Standard)
- **Regulatory Advisory Material with NDT**
 - AC 65-31, AC 25-29



AC 65-31 & AC 25-29



Advisory Circular

Subject: Training, Qualification, and Certification of Nondestructive Inspection Personnel

Date: 2/24/14

AC No: 65-31B

Initiated by: AFS-300

Change:

1. **PURPOSE.** This advisory circular (AC) contains recommendations for the experience, training, qualification, examination, and certification of nondestructive inspection (NDI) personnel for the inspection of aircraft, engines, propellers, accessories, and other aviation components. It recommends criteria for the qualification of personnel requiring appropriate knowledge of the technical principles underlying the nondestructive tests they perform. This document applies to those individuals directly responsible for technical adequacy of the NDI methods used, as well as those persons or organizations providing training, supervision, or

AC 65-31: Training, Qualification, and Certification of Nondestructive Testing Personnel

AC 25-29: Development of a Nondestructive Inspection Program/Organization

4. DISCUSSION.

a. **Qualified NDI Personnel.** This AC recommends requirements for the qualification and certification of nondestructive personnel performing nondestructive testing (NDT) and NDI. Qualified personnel are required for reliable performance of NDT. Both the performance of tests and the interpretation of results require skill and must be accomplished by trained personnel. They must know the applications and limitations of the various NDT methods used to locate defects in aircraft structure and components. Persons performing NDT, NDI, or nondestructive evaluations may be qualified in accordance with one or more of the standards listed in paragraph 6. Other qualification documents may be used when they are included in the approved manual for the organization specified in the contractual document between the user of the NDI services and their provider. The applicable revision should be the latest unless otherwise specified. Qualification should be based on an examination and/or other demonstration of proficiency, competence, and experience, as set forth in the relevant documents.

b. **Records and Documentation of Administrative Practices.** An organization's records should include a description of the details to be recorded for each qualified individual and



Advisory Circular

Subject: Development of a Nondestructive Inspection Program/Organization

Date: 9/20/13

AC No: 25-29

Initiated by: AFS-300

Change:

1. **PURPOSE.** This advisory circular (AC) provides guidance for the development of organizations and facilities performing nondestructive inspections (NDI). This material is neither mandatory nor regulatory in nature and does not constitute a regulation. It describes an acceptable means, but not the only means, for developing NDI facilities, as well as organizational and quality manuals. We, the Federal Aviation Administration (FAA), will consider other methods of demonstrating compliance that you may elect to present. We use the terms "must" and "will" in this AC only to ensure you correctly apply the recommendations of

official record in paper or electronic form.

c. **Experience.** Actual performance or observation conducted in the work environment that results in acquiring knowledge and skills. Although experience is not obtained during classroom or laboratory training, it does include on-the-job training (OJT).

d. **Method.** One of the disciplines of NDIs or testing (e.g., radiography, ultrasonic, etc.). Each method consists of its own different techniques.

e. **On-the-Job Training (OJT).** Training, during work time, in learning instrument setup, equipment operation, recognition of indications, and interactions under the technical guidance of an experienced Level II, Level III, or other designated individual.

f. **Organization.** A corporation or other similar entity established to provide or receive NDI services.

g. **Procedure.** A detailed, written instruction for conducting NDIs or to qualify personnel.

Policy & Guidance Under Review at FAA

- AC65-31B, Training, Qualification, & Certification of Nondestructive Inspection Personnel (2014)
 - AC25-29, Development of a Nondestructive Inspection Program/Organization (2013)
 - **Order 8900.1 Volume 6 Chapter 11 Section 27, Inspect a Nondestructive Inspection Program – Facility**
 - **Order 8110.54A, Instructions for Continued Airworthiness Responsibilities, Requirements, & Contents**
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- FAA Course 22518, Nondestructive Inspection and Evaluation (2015)
 - Job Aid Nondestructive Inspection For Aviation Safety Inspectors (2013)
 - Job Aid Evaluating A Repair Facility Conducting Composite Repairs
 - Job Aid Evaluating Additive Manufacturing at an MRO (2018)
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- **NDT Network input is one of many inputs – not the final copy**



Challenges

Industry Challenges

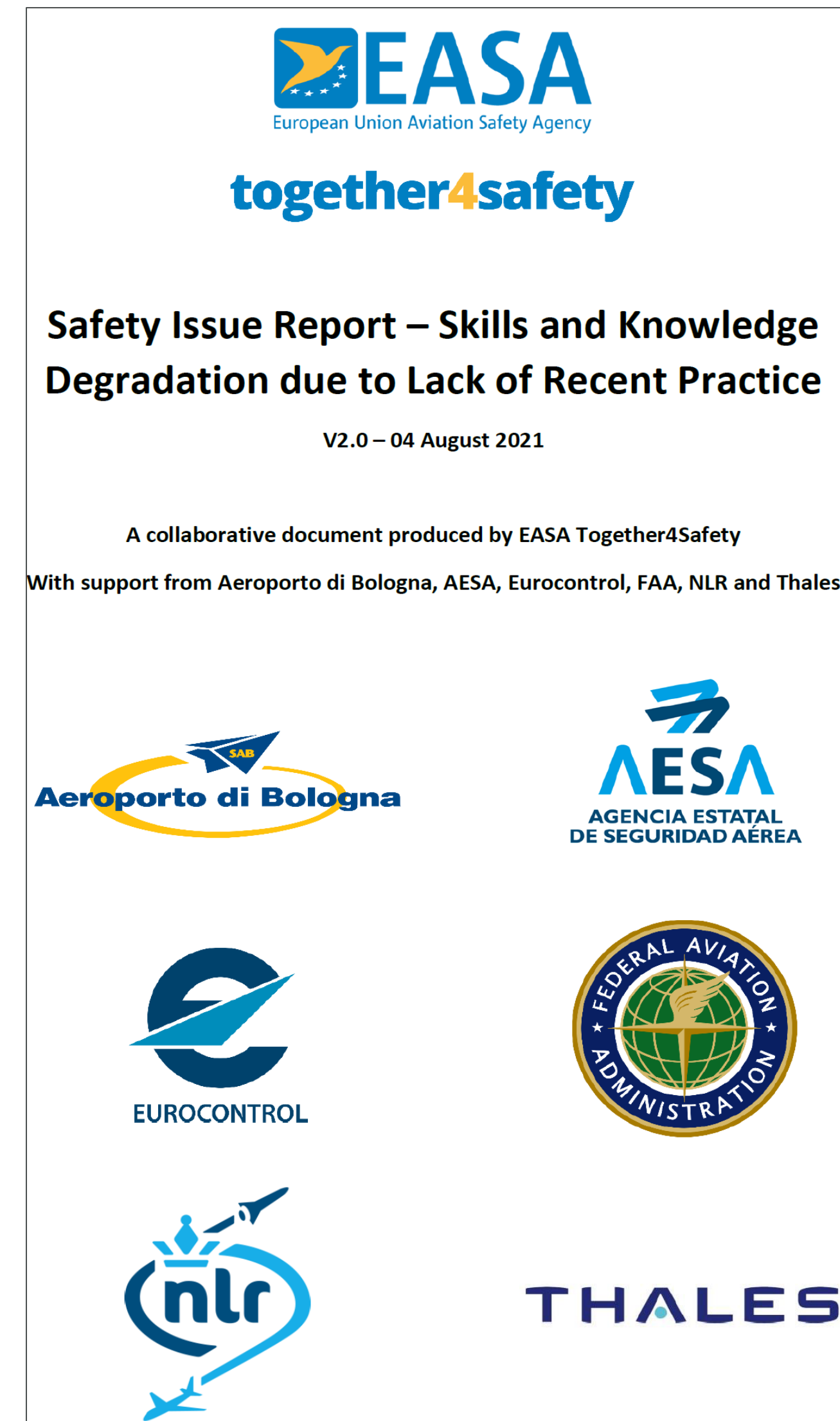
- Broad Network – multiple stations with NDT
 - OJT hours a challenge at some stations
- Pandemic effects
 - Loss of experience (including some Level IIIs)
 - Training churn – Level IIIs almost exclusive to training (less time for emerging NDT, program oversight)
 - Busy! - No time for ‘job shadow’ OJT
 - Fleet turnover – New fleets, mix of fleets seen by station, etc.
- Some Techniques used by ‘non-NDT’ personnel
 - Fleet AMMs = Thermography for wiring, duct leaks
 - Dent scanners (similar to Ramp Damage Checker – NDT not called unless result is unacceptable)



Industry Challenges

- Emerging NDT, Automation, AI
 - Recency of experience is most important
 - More automation => less 'feel'
 - Diverging skill set: either simple or advanced
 - Image reading cert (DR/film) vs full RT/CT/DR
 - UT vs PAUT
- Direct reading 'loophole'

**Are we at risk of having proficiency eroded
by using more automation & emerging
methods?**



AC 65-31 Revision

Qualifications for 'designated individual'

- **What qualifications are required for an "other designated individual, or can anyone be designated?"**

From: On-The-Job Training (OJT). Training in the work environment. Learning objectives should include instrumentation setup, equipment operation, recognition of indications, and interpretation and should be accomplished under the technical guidance of an experienced Level II, Level III, **or other designated individual**

To: On-The-Job Training (OJT). Training in the work environment. Learning objectives should include instrumentation setup, equipment operation, recognition of indications, and interpretation and should be accomplished under the technical guidance of an experienced Level II, Level III, or other **documented and qualified individuals approved by a level III**

Virtual Training, A&P Certificate

- **Do we put something about 'remote/virtual training'?**

Training. An organized and documented program of activities designed to impart the knowledge and skills necessary for qualification. This program may be a mix of classroom, laboratory, programmed self-teaching, **remote/ virtual** and OJT **as defined per the approved program.**

Training, Experience, and Credentials. To properly perform the necessary tasks, NDI personnel should have appropriate training and experience and, when required by the qualifying organization, hold a valid and current airframe and/or powerplant mechanic certificate or repairman certificate.

Instructors are not required to hold such certificates unless it's a prerequisite of the qualifying organization. Possession of an FAA airframe and powerplant (A&P) mechanic certificate may be considered part of the required training experience **as defined in the organization's written practice**

Level I Special/Limited

- **Added:**

Personnel may be qualified to this level to perform a specific task on a particular component **and evaluations for acceptance or rejection.**

The individual should:

- (a) Be knowledgeable of any necessary preparation of parts before or after inspection.
- (b) Be able to follow procedures pertinent to the techniques for which he/she is qualified.
- (c) Receive the necessary guidance or supervision from a qualified Level II, Level III, or other documented and qualified individuals approved by a level III.
- (d) Meet the training and experience guidelines in Table 1, Minimum Classroom Training and Experience Requirements.

Table of Classroom & Experience Hours

- **Classroom hours, Experience hours need to be re-evaluated to meet current industry requirements (NAS410 or SNT-TC-1A). Why should the requirements for certification be less stringent for aviation than other industries?**
 - Efforts were exhausted to assemble respective sections of NAS410 and ATA105 and propose some mark up.
 - NDT network was mixed on **reduction of some hours** (as in 410 & 105). Supporting rational in favor of the reduction is equipment simplicity and improvements no longer require these times.
 - Consensus was gained to **remove the months parameter** in the chart

Emerging NDT Methods, Automation



9. INSPECTION ASSISTANCE VIA TECHNOLOGY

Recency of experience in a method or technique (Section 7) is one of the important drivers in inspector proficiency. Often, NDI methods and techniques are being automated for better efficiency. However, the use of technology can degrade inspector proficiency if not utilized properly. Legacy Training and qualification schemes may not adequately address emerging methods or techniques. The use of technology should be an 'assistant' for the inspector and not used as a substitute for a qualified and certified NDI inspector. This includes both during the training and experience (Section 8) and during normal operations.

Emerging NDI technology and automated conventional NDI methods are often claimed as 'Direct reading' in order to avoid the stringent requirements in Section 8. Therefore, each inspection method and technique must be examined by the Level III or their designee prior to implementation. A method or technique should not be labelled as 'Direct Reading' unless specified by the Level III or their designee in the written practice.

AI – “Assisted Defect Recognition”

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The use of artificial intelligence/machine learning/data analytics has potential for great utility in NDI inspections, but also must be handled with great care. Any information used to assist in decision making (Assisted Defect Recognition or Assisted Data Analysis) must be verified and understood by the inspector (AI explainability). EASA has provided different levels of autonomy based on the human-machine interface. Therefore, some aspects of artificial intelligence/machine learning/data analytics are recommended to be included during training and experience (Section 8). At all times, the Level III should approve of any artificial intelligence/machine learning/data analytics utilized, whether during training or in operations.

Specific Examination



- **Leveraging existing language in other standards (NAS410/EN4179):**

The specific examination shall be an open book examination covering the requirements and use of the specifications, codes, standards, equipment, operating procedures, product knowledge, and test techniques the candidate may use in the performance of his/her duties with the employer. A minimum of 30 questions shall be administered for the specific examination at Levels 1, 2, and 3. Reference material, as determined by the Responsible Level 3 or Examiner, such as specifications, tables, formulas, etc. shall be provided. Questions utilizing such material shall require understanding of the information contained therein rather than merely finding its location.

Reexamination



- **How much time do you give before a re-test?**

From: Reexamination. Candidates failing the examinations may be given time for additional studies and be reexamined at the discretion of the organization, and as provided in the organization's written program. The reexamination should not utilize the same questions, test samples, or indications that were used in the initial examination.

To: Reexamination. Candidates failing the examinations may be given time for additional studies and be reexamined at the discretion of the organization, and as provided in the organization's written program. **The candidate should be provided with both applicable subject specific remediation and sufficient time to prepare for subsequent testing.** The subsequent test should not utilize the same questions, test samples, or indications that were used in the initial examination.

AC 25-29 Discussion Topics (Just starting)

Changes in AC 65-31 Plus:



- The individual in charge of the NDI organization should, at a minimum, meet the requirements for **Level II** qualification in the methods used, per an industry-accepted standard.
- Clarification of Inspection record
- **Visual inspection included** (not included in AC 65-31) as Six Most Common NDI Methods
- NOTE: While visual inspection is the most common inspection method, industry standards currently do not contain certification requirements for visual inspectors.
 - **(4) An NDI organization should define and utilize a training program for visual inspections.**
 - **Task cards should specify the use of visual tools (e.g., flashlights, videoscopes/borescopes, calipers, micrometers, rulers, and magnifying devices) when required**
- **UT does not include PAUT**
- **Radiography only includes film/darkroom**
- Reminder: Not the final versions yet (One of many inputs)
- **Join us for these discussions! See Hoyng or Berger.**





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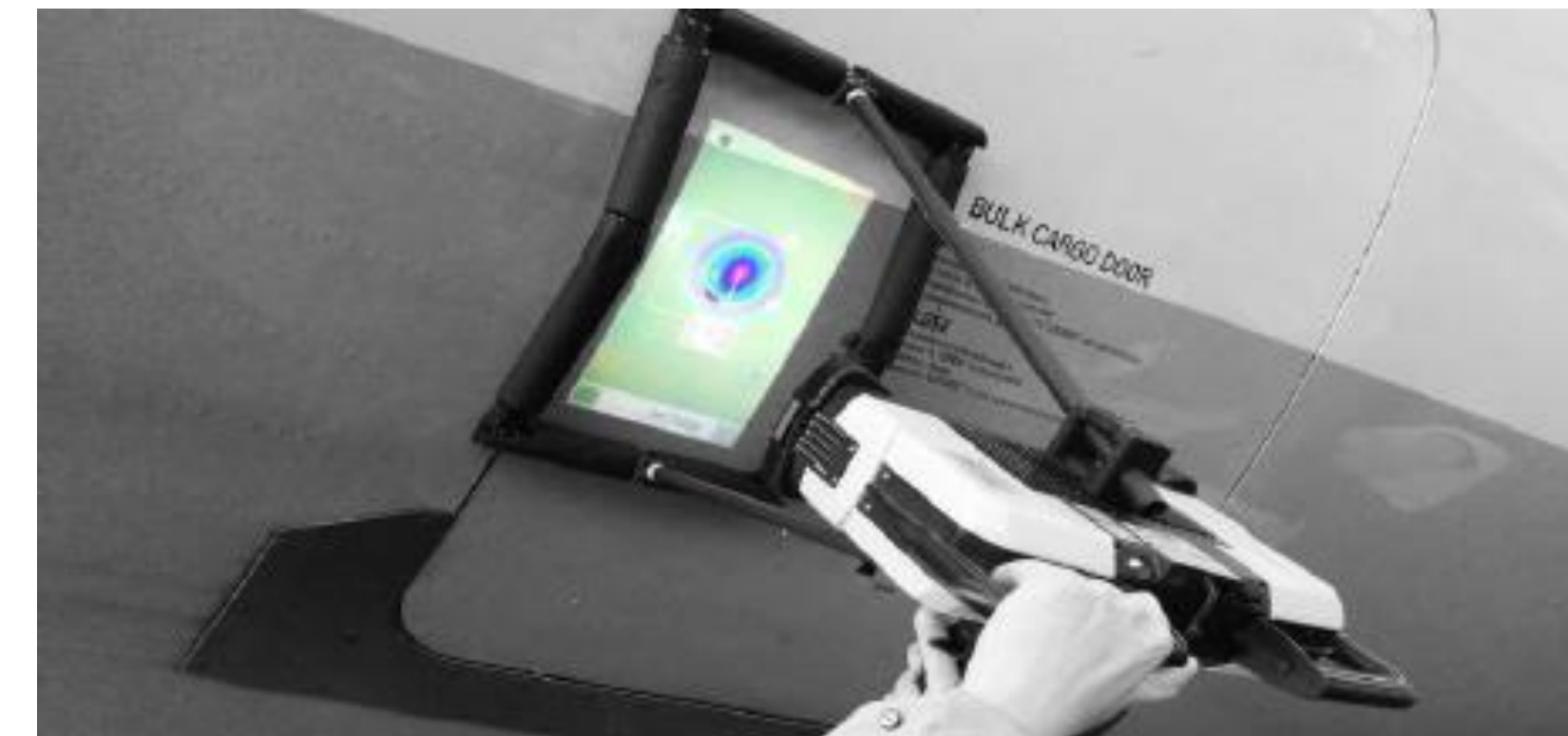
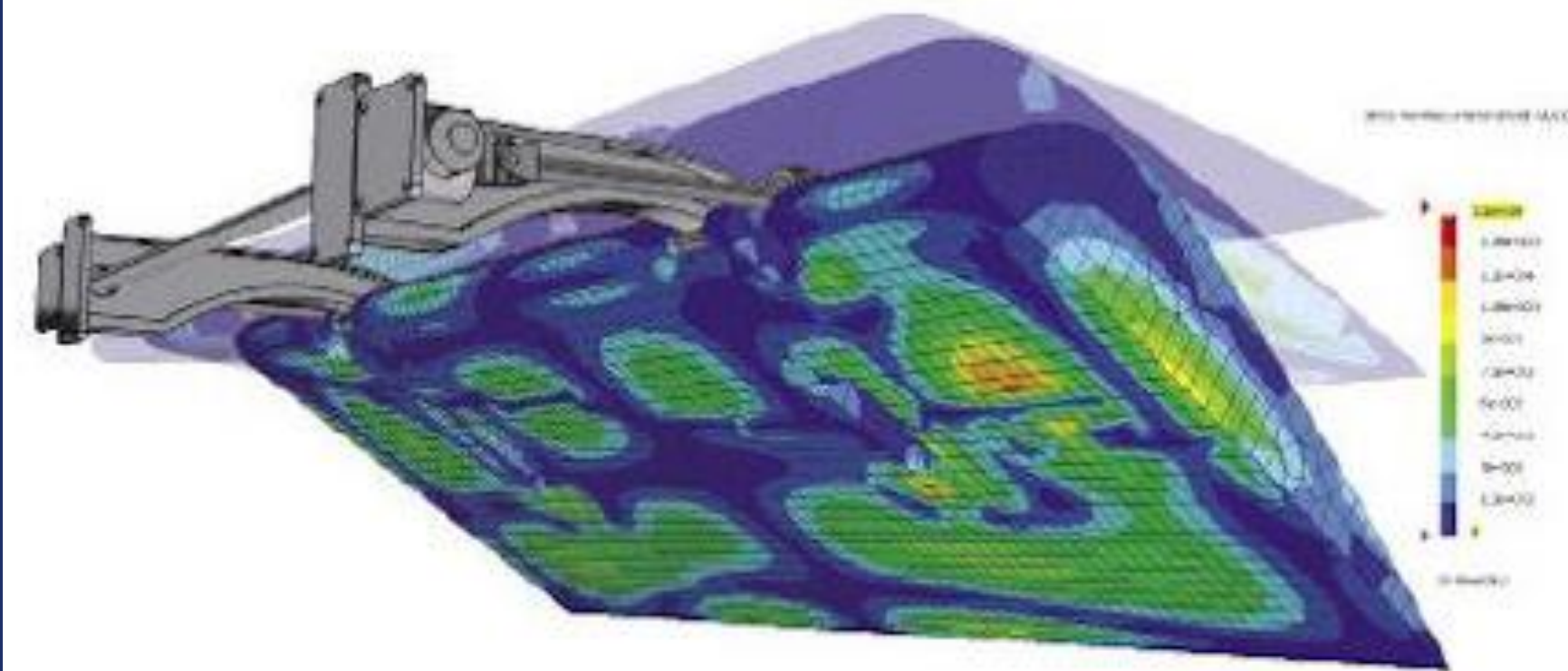
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QUESTION & ANSWER

