



Accelerating Global SHM Adoption Through Strategic Training

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**NONDESTRUCTIVE
TESTING FORUM**

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Who are we?

- A short introduction to Testia
- Introduction to SHM at Testia
- Our Experiences with NDT training
- Why do we need SHM training?
- Proposed SHM training Syllabus
- Qualification & certification - CVM

MISSION

We make flying safe





VISION

Become the Aerospace reference
in structural integrity

Our strengths



30+ years
of expertise



~500 talented
people



18 sites
worldwide



~€55 million
of revenues

A global delivery model to better serve your needs



- France (HQ)
- Spain
- United Kingdom
- Germany
- Mexico
- Canada
- Singapore
- Malaysia

Our global end-to-end solutions focus on structural integrity

Training & Qualification

Multilingual courses & accreditations across aerospace NDT methods

Inspection

NDT inspection from elementary parts & throughout asset life cycle

Engineering

A broad range of engineering services guaranteeing structural integrity

Products & Equipment

Augmented inspection, process automation and embedded intelligence

Bringing solutions to multiple high-end technology sectors

Aeronautics



Automotive



Sustainable Energy



Urban Air Mobility



Naval



Oil & Gas



Defence & Space

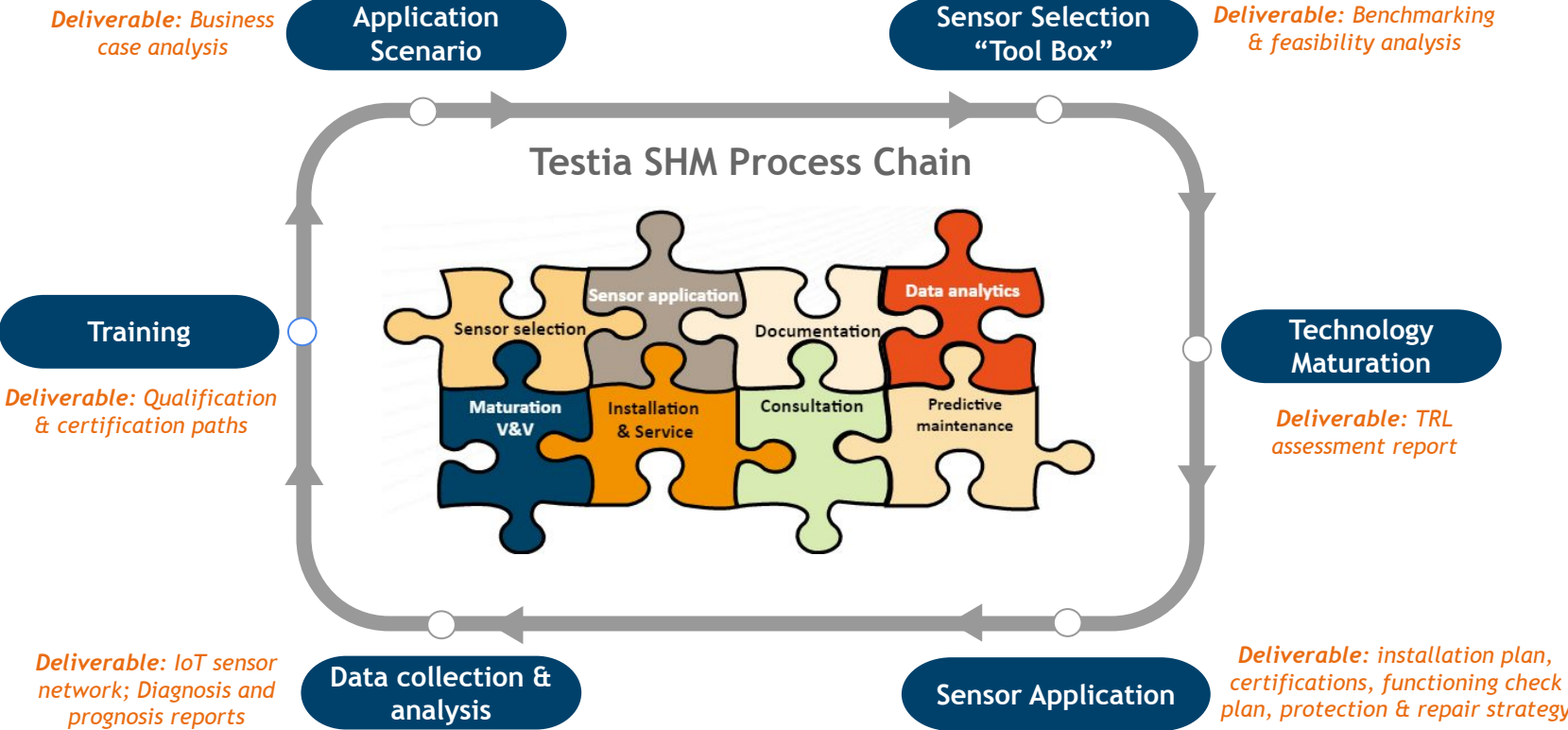


Wind Energy

What we do? - SHM

- A short introduction to Testia
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- Why do we need SHM training?
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- Qualification & certification - CVM

SHM at Testia (Keywords: end-to-end, last mile)



SHM Training

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NDT Training

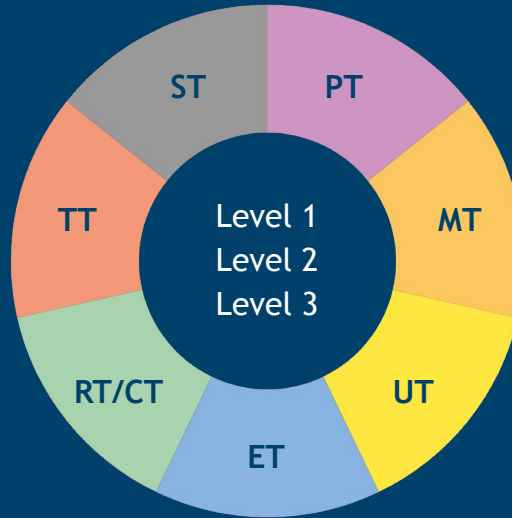
25 000+ trained and certified NDT inspectors since 1994

On-site, Off-site and E-Learning sessions

Customized & mobile classrooms, access to real aircraft components

Equipped with the latest NDT devices

Training future inspectors for continued safety



50+ training courses available

FR, EN, DE, ES

Qualification Level 3 services, NADCAP preparation, Audit

Powered by 30+ senior NDT trainers

Why do we need training in SHM?

- **Maintaining quality and consistency**
 - Creates a clear structure, promotes good work practices and fosters trust and confidence in SHM.
- **Helps with structured knowledge transfer**
 - Ensures the availability of trained and qualified staff deliver the same quality levels.
- **Meeting regulatory demands**
 - Ensures that the quality of SHM implementation is maintained even at scale (globally).
- **Progressive learning and skill development**
 - Allows and promotes a gradual and structured learning process.
 - Develop necessary knowledge and skills at each stage of the learning process.
 - Career advancement opportunities and new opportunities.



SHM General Training

Not technique specific

- Introduction to SHM Technology and SHM Implementation (Module 1)
- SHM Validation, Performance Assessment & Prep for Routine Use (Module 2)
- Integration of SHM into Airline Maintenance Programs (Module 3)
- SHM Certification & Approval: Regulatory & Industry Guidance (Module 4)
- Installation and Monitoring of SHM Systems (Module 5)

SHM Qualification

Technique specific

- Considered as Module 6 within the SHM training syllabus.
- Inspired from the EN4179, ASNT and NAS-410 structure - *Qualification of personnel for non-destructive testing*
- **Qualification** of personnel would include theory and practical modules (not specific to use-cases)
- **Certification** of personnel would require additional theory and practical modules, which are use-case specific

SHM Certification

Technique and use-case specific

- Theory may have some overlap with previous modules.

Qualifications and Certification - Level 1

Levels

- Level 1 - SHM Inspector
- Level 2 - SHM Installer
- Level 3 - SHM Trainer
- Level 3 (expert) - SHM Instructor

Inspired from EN4179 and NAS-410

EUROPEAN STANDARD **EN 4179**
NORME EUROPÉENNE
EUROPÄISCHE NORM
December 2021
ICS 03.100.30; 19.100; 49.020
Supersedes EN 4179:2017

English Version

Aerospace series - Qualification and approval of personnel
for non-destructive testing

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FED. SUPPLY CLASS

**NAS CERTIFICATION & QUALIFICATION OF
NONDESTRUCTIVE TEST PERSONNEL**
STANDARD PRACTICE

Qualification

Level 1

- Applicable for those collecting sensor data (not interpreting data)
- Expected to follow work instructions under L2, L3 guidance
- Minimum theory training hours $\geq 25\%$ of L1 training hours
- Minimum practical training hours $\geq 10\%$ of L1 training hours
- Theory examination - minimum 10 questions
- Practical examination - using work instruction to perform at least one inspection
- Scoring requirements - minimum 70% in both sections (average score $\geq 80\%$)
- Qualification validity - 2 years
- Recertification - 2 year intervals

Certification

- Additional use-case specific training ($\geq 25\%$ of L1 theory and $\geq 10\%$ of L1 practical training)
- Specific examination - 8 theory questions and use-case specific practical examination (scoring requires same as previously mentioned)
- Certification validity 2 years
- Recertification - if no engagement (span: 6 months)

Qualifications and Certification - Level 2

Levels

- Level 1 - SHM Inspector
- Level 2 - SHM Installer
- Level 3 - SHM Trainer
- Level 3 (expert) - SHM Instructor

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**NAS CERTIFICATION & QUALIFICATION OF
 NONDESTRUCTIVE TEST PERSONNEL**
 STANDARD PRACTICE

Qualification

Level 2

- Applicable for those who mainly install sensors (under L2, L3 guidance)
- General theory training (classroom) - 16 hours (5% overlap with modules 1-5)
- Practical training hours (classroom and on-the-job training) - xxx hours
- Theory examination - minimum 40 questions
- Practical examination - demonstrate proficiency in reading work instructions to perform installation (at least 2 different specimen)
- Scoring requirements - minimum 70% in both sections (average score \geq 80%)
- Certificates and documents: exam completion, experience record, qualification certificate
- Qualification validity - 5 years; Recertification - 5 year interval

Certification

- Additional use-case specific training (classroom training \geq 16 hours, aircraft training \geq 34 hours)
- Specific examination (theory: minimum 30 questions use-case specific and practical - demonstrate proficiency on use-case specific installation)
- Certificates and documents: use-case specific certificate and experience record.
- Qualification validity - 2 years;
- Recertification - if no engagement (span: 6 months)

Qualifications and Certification - Level 3

Levels

- Level 1 - SHM Inspector
- Level 2 - SHM Installer
- Level 3 - SHM Trainer
- Level 3 (expert) - SHM Instructor

Inspired from EN4179 and NAS-410

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**NAS CERTIFICATION & QUALIFICATION OF
NONDESTRUCTIVE TEST PERSONNEL**

STANDARD PRACTICE

Qualification

Level 3

- Applicable for those who mainly provide guidance for Level 1 and Level 2
- General theory training (classroom) - 30 hours (25% overlap with modules 1-5)
- Specific training (deep dive into sensor components) - 16 hours
- Practical training hours (classroom and on-the-job training) - xxx hours
- Theory examination - minimum 40 questions
- Practical examination - demonstrate proficiency in reading work instructions to perform system setup and carry out performance checks (at least 2 different specimen)
- Scoring requirements - minimum 70% in both sections (average score $\geq 80\%$)
- Certificates and documents: exam completion, experience record, qualification certificate
- Qualification validity - 5 years; Recertification - 5 year interval

Certification Train the installer

- Additional training: 80 hours (training and guiding L1 for at least 5 aircrafts)
- Specific examination (theory: minimum 30 questions use-case specific and practical - demonstrate proficiency on use-case specific installation)
- Certificates and documents: use-case specific certificate and experience record.
- Qualification validity - 5 years; Recertification - if no engagement (span: 1 year)

Qualifications and Certification - Level 3 (expert)



Levels

- Level 1 - SHM Inspector
- Level 2 - SHM Installer
- Level 3 - SHM Trainer
- Level 3 (expert) - SHM Instructor

Inspired from EN4179 and NAS-410

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FED. SUPPLY CASE

NAS CERTIFICATION & QUALIFICATION OF
NONDESTRUCTIVE TEST PERSONNEL
STANDARD PRACTICE

Qualification

Level 3 (expert)

- Applicable for those who would provide guidance to L2 and act as an instructor (technical responsible)
- General theory training (classroom) - 80 hours (80% overlap with modules 1-5)
- Specific training (designing custom solutions & troubleshooting methods) - 40 hours
- 1 year of L2 experience (technique specific) if you hold a university degree or 2 years for those without
- Theory exam - building custom SHM solutions for specific use-cases
- Practical examination - development and implementation of SHM solutions and preparing work instructions (for 2 different use-case)
- Interview - conducted by 3 members of the certification committee
- Scoring requirements ~ L1 and L2; Certificates ~ L2
- Qualification validity - 5 years; Recertification - 5 year interval

Certification Train the trainer

- Additional training: 100 hours (training and guiding L2 for at least 5 aircrafts)
- Specific examination (theory and practical - specific to custom solution design and troubleshooting methods); Certificates ~ L2
- Qualification validity - 5 years; Recertification - if no engagement (span: 3 year)

Qualification & Certification - CVM



- September 25, 2023
 - AEM and Testia pen CVM Sensor Installation and training agreement.
- Role of Testia
 - Deliver a complete end-to-end installation training program to airline maintenance teams and third parties.
 - Use-case: B737 Aft Pressure Bulkhead (APB) inspection using CVM.
 - Also responsible for creating and maintaining training records and certifications (quality control).
- The goal is to develop a training program for certifying personnel for implementing CVM for APB (L2 and L3)



Level 2 training - CVM Installer

Who can participate?

- If you have been nominated to conduct CVM installations.
- You have relevant airframe experience.
- You have basic understanding of inspection procedures.

What can we offer?

- Classroom training and training on aircrafts (2 aircrafts) - total 6 days.
- Includes:
 - General introduction to CVM and specifics.
 - Surface preparation & conditioning training.
 - Hardware & software training.
 - Live installations, cabling guidelines and functional testing.

What you would get?

50 experience hours (approved by L3)

L2 completion certificate (Testia-AEM)

Guidelines

- L2 examination (theory and practical) -after the completion of the 50 hours.
- L2 qualification certificate provided after the exam is successfully completed.
- Additional hours - to be approved by L3 (internal or from Testia L3)
- Renewal timeline - 2 years.
- Recertification - if no installations are made within a 6 month time span.



Level 3 training - Train the Installer



Who can participate?

- You have L2 and 200 hours of experience (or 50 if you are nominated - special case).
- You have been nominated to train installers in your organization.
- You wish to have deeper understanding of CVM and how it works.

What can we offer?

- Work alongside experienced trainers during installation training.
 - Trainings 1 & 2 - as observer
 - Trainings 3 & 4 - conduct with help
 - Trainings 5 - conduct alone
- Deeper understanding of CVM and its working (3 day visit to AEM recommend)

What you would get?

120 additional experience hours

L3 completion certificate (Testia-AEM)

Guidelines

- L3 examination (theory and practical) -after the completion of the 120 hours.
- L3 qualification certificate provided after the exam is successfully completed.
- Additional hours - to be approved
- Renewal timeline - 5 years.
- Recertification - if no trainings are conducted within a 1 year time span.

Conclusions

- We propose a SHM qualification & certification inspired from EN4179, ASNT and NAS-410 standards
- Similar to the NDT standards, we propose 3 levels of qualification
- Training (theory & practical) necessary for personnel qualification were listed
- Qualification and certification requirements for the various levels were introduced
- SHM certification structure for implementing CVM were introduced (use-case: APB)
- We emphasize the importance of a structured training program for global SHM adoption

Any questions?

Thank you



Curious for more?

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