

# MAPOD

## Model Assisted Probability of Detection

### Project partners



### Contact details

TWI Technology Centre Wales  
Harbourside Business Park  
Harbourside Road  
Port Talbot  
SA13 1SB  
UK

Project Manager  
Ian Nicholson  
Tel: +44 (0)1639 873100  
Email: [ian.nicholson@twi.co.uk](mailto:ian.nicholson@twi.co.uk)

Technical Lead  
Charles Schneider  
Tel: +44 (0)1223 899213  
Email: [charles.schneider@twi.co.uk](mailto:charles.schneider@twi.co.uk)

Advisory Group Co-ordinator  
Ian Cooper  
Tel: +44 (0)1639 873113  
Email: [ian.cooper@twi.co.uk](mailto:ian.cooper@twi.co.uk)



Development of a protocol  
for acceptance of new NDT

# MAPOD

TWI is inviting aerospace companies and other organisations with an interest in the implementation of new non-destructive testing (NDT) techniques in the sector to join a newly formed industrial advisory group. The group will guide the creation of a new protocol designed to support quicker uptake of novel NDT methods.

## Challenge

The high cost and long duration of experimental probability of detection (POD) trials for NDT technique qualification has made them impractical, prompting calls for an alternative approach.

Model-assisted POD (MAPOD) trials save time and money by replacing certain aspects of the POD trials with theoretical models. Ideally it would be possible to model each contributor to the NDT reliability of a work instruction separately before combining the contributions to determine the overall POD.

## Investigation

TWI is leading a three-year investigation into development of a new protocol for acceptance of new NDT. Based on recommendations from the Military Aircraft Structures Airworthiness Advisory Group (MASAAG), this work is being carried out in conjunction with project monitor DSTL and the University of Bristol, which is providing aerospace NDT experts for technical oversight of the project.

## Project objectives

The objective of this work is to create, draft, and demonstrate a protocol for MAPOD NDT technique validation for military air domain applications.

There are four parts of the Work Programme:

- 1) Underpinning research and modelling for new NDT technologies
  - 2) Draft and review a protocol for model-assisted validation of NDT techniques
  - 3) Demonstrate the approach on one conventional and one new technology
  - 4) Extend the approach to composite materials.
- These will be achieved through the work packages shown in Figure 1.

The chosen application for a staged trial of the protocol for parts 1-3 is the detection of cracks from fastener holes using angle-probe ultrasonic inspection, ranging from manual 'swivel' scanning and manual phased array sector and linear scans with operator-based analysis, to full matrix capture and automated phased array scanning with automated analysis. For part 4, a large-area composite inspection will be used for demonstration.

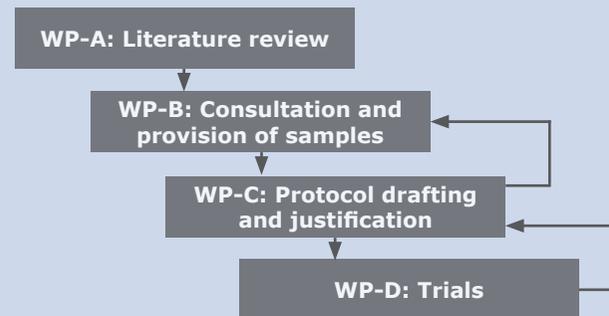


Figure 1 Work Programme

## Industrial Advisory Group

To make the project a success and ensure a coherent approach to the establishment of a model-assisted technique-validation protocol, it is highly desirable to involve industrial stakeholders.

**An Industrial Advisory Group (IAG) is to be established to assist with defining the protocol requirements, scope and constraints.**

The group will meet at least once per year; more frequently depending on interest.

If you would like to join this group please contact us.

## Dissemination of results

Project results will be disseminated to a wide range of stakeholders and will include presentation of the finished protocol to the IAG, MASAAG, and BINDT committees and working groups, including the Aerospace Group, the Technique Validation Working Group, the Composites Committee, the Full Matrix Capture User Group and the Standards Working Group. The draft protocol, the interest and support received from the IAG, and minutes of meetings from interested bodies will all be used to build a case for the creation of a standard.

Through engagement with the BINDT Standards Working Group, BSI ACE 61/5, ADS NDT SIG and the UK Aerospace NDT Forum, TWI will lobby BSI, CEN, ISO and DIN committees to raise a work task to review the protocol with the intention of raising a prEN standard.

**Join now and be part of the industrial advisory group.**