

# Cascade Aerospace Engineering

## Conception Development Certification

# Fatigue & Damage Tolerance

Ensuring the Safety & Durability of Aerospace structures

## Our capability

- Development of Load Spectra
- Fatigue life prediction based on S-N curves
- Fracture mechanics based crack growth prediction
- Stress intensity factor calculations
- Failure analysis
- Corrosion assessment
- Engineering critical assessment of existing structures and mechanical components
- F&DT analysis of Aerostructures at all stages of the product life cycle (design, certification, in-service repairs, failure investigations)
- Test programme development and data usage
- Fast Jet Fatigue formula development
- Damage tolerance analysis for aircraft life extension programmes.



## Our experience

- A320NEO F&DT Analysis of Wing Root, Flap Support, Engine Pylon Support, Sharklet and Rib 27
- A320NEO F&DT Certification Analysis of Wing Root, Flap Support & Engine Pylon
- A380 Certification F&DT Approval
- A400M EIS Flap Beam Fitting Modification Static/F&DT Design & Certification
- A350XWB FTE concept, Plateau, C-Maturity, DFEM and Certification
- A350 Test Definition and Load Correlation Support
- A350 Main Landing Gear Fatigue Certification Analysis
- P-8A Poseidon Wing & Fuselage Stores Pylon F&DT Design & Certification
- Harrier I & II F&DT Analysis, Assessment and life extension programmes

### Airbus Delegated Signatories

- Release to manufacture for Metallic structure on A350 FTE
- FEA Approval for A350 FTE & A400M
- F&DT Approval for A320NEO

### Other Historic Approvals

- Boeing Wide Body Stow Bins Lead
- Static Signature for Harrier I & II
- Static Signature for Nimrod MRA4



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Experience at a Glance

## Case Study – A320NEO Wing Certification

- Conducted F&DT Certification Analysis for Wing Root Cover, Stringers & Spars, Flap Beam Attachment Support Structure & Engine Pylon Attachment Support Structure.
- Generation and development in conjunction with Airbus technical teams of the appropriate approach to perform equivalent legacy F&DT analysis using the current ISAMI approach. This needed to be done such that the legacy aircraft were not shown to be invalidated, whilst being able to certify the new NEO variant to the more stringent requirements.
- Approval of Airbus Certification Stress Dossiers for the Engine Pylon Attachment Support Structure.
- Mitigation in agreement with Airbus technical of any low lives generated using pragmatic modifications to methods and approaches to demonstrate the certified lives were obtainable.



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BUREAU VERITAS  
Certification

