STRUCTURAL INTEGRITY AND PROGNOSTICS

Impact and fatigue damage monitoring of structures

Highlights:
- Sensor network design for Load Monitoring and Structural Health Monitoring (FBGs, Piezo-transducers, CVM, etc.);
- Model-based real-time diagnosis of fatigue damage and harsh landing damage for aeronautical platforms;
- Real-time prognosis of residual lifetime for components subject to fatigue crack growth;
- Real-time model identification and updating of material properties;
- Real-time impact detection, localization and energy assessment.

Applications:
- Aerial systems;
- High risk environments.

Methods:
- Numerical FE simulations (ABAQUS);
- Experimental tests (Fatigue crack growth, low/high velocity impact);
- Machine learning approaches (Artificial Neural Networks) and statistical analyses (frequentist and Bayesian method).

Collaborations:
- Universities: University of Sheffield (UK), University of Patras (Greece), AGH (Poland), etc.
- Military agencies: AFIT (Poland), INTA (Spain), EDA (EU)
- Companies: AgustaWestland (Italy), Alenia Aermacchi (Italy), SINTEF (Norway), etc.

Projects and founding:
- EDA Cat. A project, HECTOR (350 K€);
- EDA Cat. B project, ASTYANAX (500 K€);

Selected papers:

Contacts:
Prof. Marco Giglio – marco.giglio@polimi.it
Ph.D. Claudio Sbarufatti – claudio.sbarufatti@polimi.it