

ILA

Berlin Air Show

ILA BUSINESS DAYS 2016

Networking & New Contacts

June 1-3, 2016, Berlin



ILA Business Sessions on 1 and 2 June

Automated Online Active Control Systems

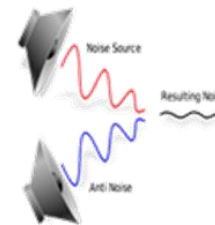
- Elevator Pitch -



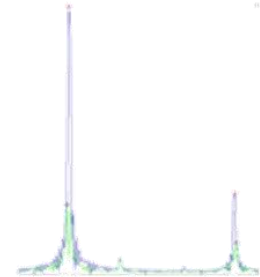


- Automated (turn-key) Online set-up - development of Active Control Systems.
- Applicable for a range of active control systems:
 - Active Vibration Control (AVC)
 - Active Structural Acoustic Control (ASAC)
 - Active Noise Control (ANC)
 - Active Flow Control (AFC)
 - Structural Health Monitoring (active/passive).
- Targeted to complex applications (e.g., prototyping), retrofitting applications (built or in-service equipment, platforms, etc), general purpose applications.

Active Noise Control



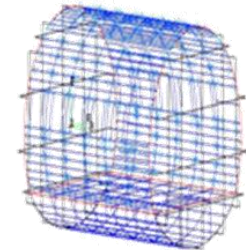
Active Vibration Control



Active Flow Control



Structural Health Monitoring





- Cabins:
 - Active Noise Control (ANC)
- Fuselage:
 - Active Vibration Control (AVC)
 - Active Structural Acoustic Control (ASAC)
 - Active Flow Control (AFC)
 - Structural Health Monitoring (active/passive)
- Flight surfaces:
 - Active Vibration Control (AVC)
 - Active Flow Control (AFC)
- Engines:
 - Active Vibration Control (AVC)
 - Active Flow Control (AFC)





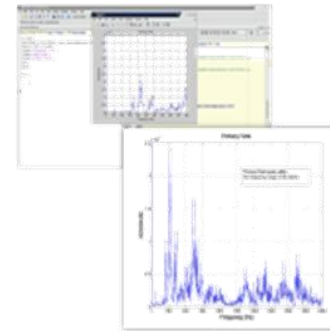
- **Frequency Analysis System**
 - Primary field is measured and dominant frequencies and their corresponding characteristics per sensor / channel are identified.
 - Highest dominant frequencies (equal to no. of available actuators) are identified; these are the frequencies to be controlled - reduced.

- **System (plant) excitation**
 - Specific data sets are created to be used for training and validation purposes in the ANN -based plant behavioral model development

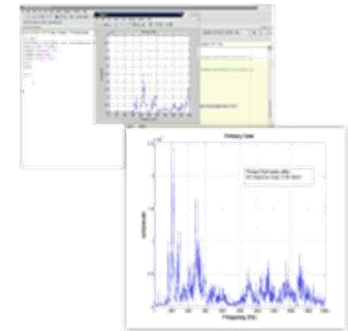
- **Neural Network -based System (plant) Modeling**
 - Given control signal inputs for each actuator, the constructed model will simulate the resulting residual field
 - The resulting model is trained and validated using the exemplar patterns created in the previous step

- **Controller Optimization - Generation**

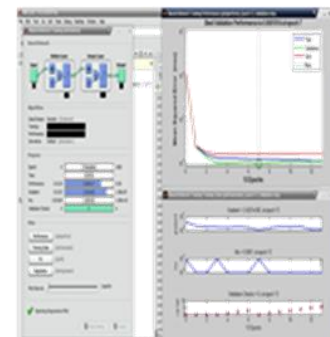
Frequency Analysis



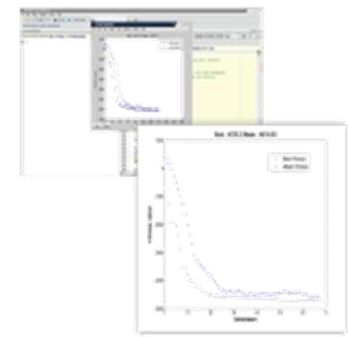
Systems Excitation



System Modeling

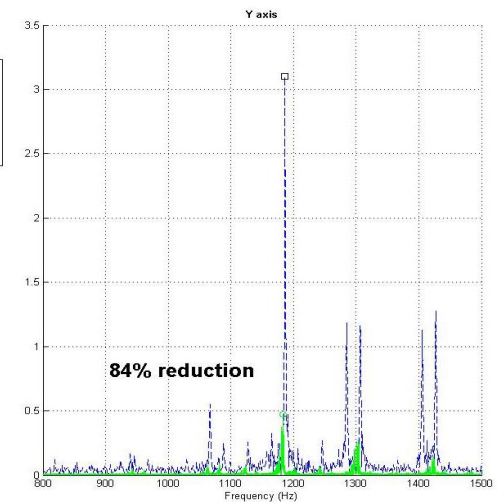
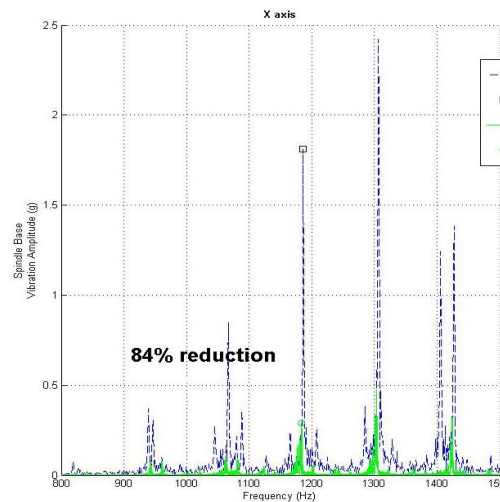
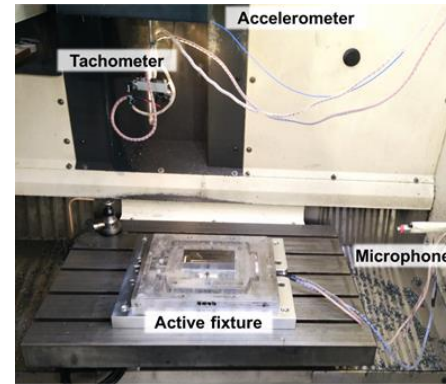


Controller Generation





- INTEFIX - Intelligent Fixtures for the Manufacturing of Low Rigidity Components (FP7 I4MS Factories of the Future project).
- Experiment: Intelligent Active Fixture for active vibration control in milling applications.
- No prior system modeling or controller development required.
- Consortium:
 - University of Firenze (IT)
 - Paragon S.A. (GR)
 - Tecma S.r.l. (IT)
 - Girardini Girardini S.r.l. (IT).





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- Interested in identifying contacts for research and commercial (development/sales) opportunities and synergies:
 - Aerospace (Aircraft (civil, business, general), Rotorcraft, UAVs, Engine applications).
 - Particular interest in retrofitting applications (in-service platforms).
 - Particular interest for in-flight system development, e.g., Active Flow Control, for UAV applications.
 - Manufacturing applications.
 - Mechanical, Electrical, Electro-mechanical systems applications.



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