SmartAnswer didactic demonstrator

S. Tamaro and the SmartAnswer Consortium

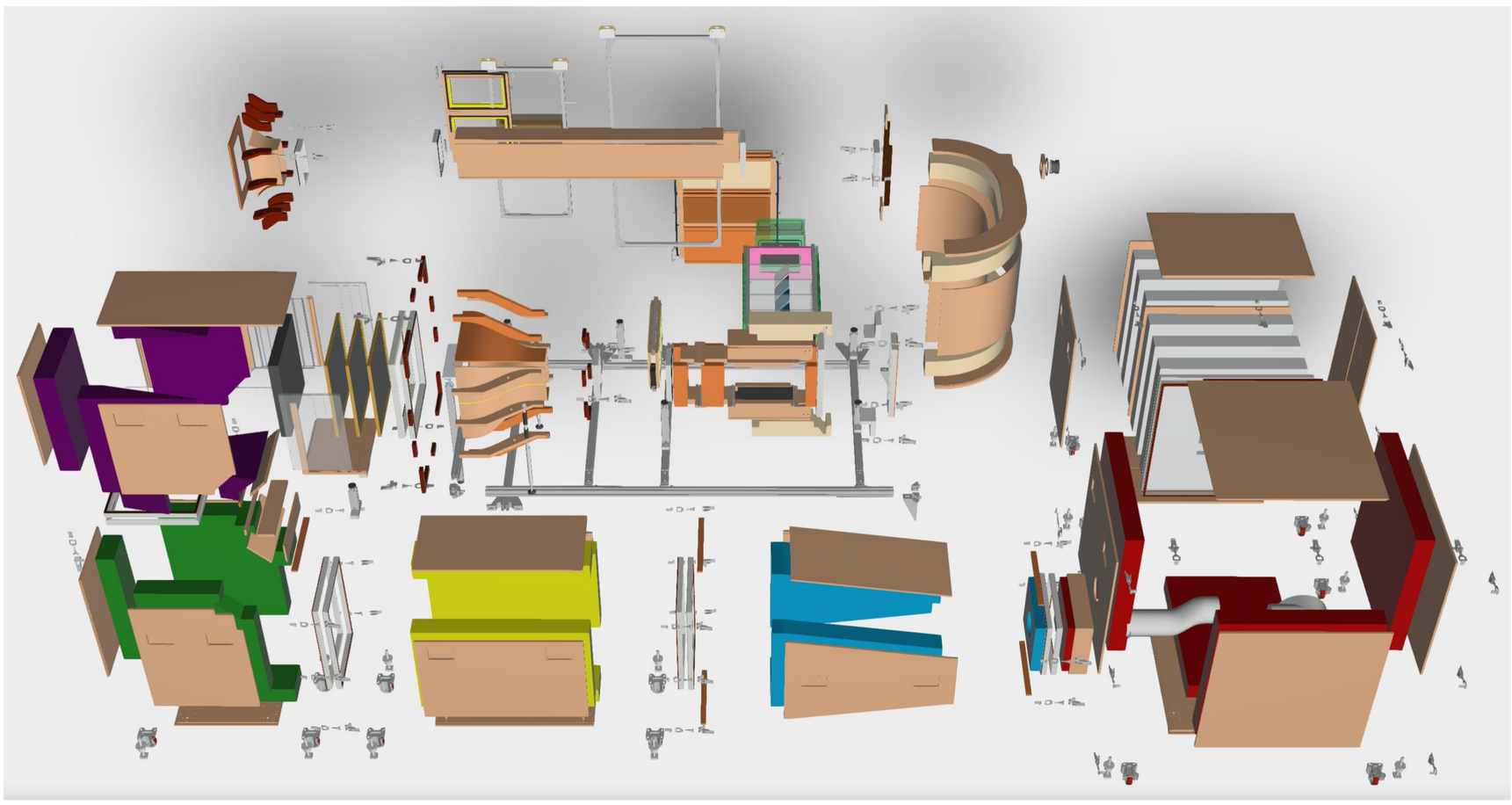
Smart Mitigation of flow-induced Acoustic Radiation and Transmission for reduced Aircraft, surface traNSport, Workplaces and wind enERgy noise

A didactic scientific and technology demonstrator

- Physical mechanisms in sound
  - generation
  - propagation
  - transmission
- Perception of the effectiveness of various noise mitigation technologies

Tamaro et al., "Development of a didactic technological demonstrator", VKI LS: Advanced concepts for the reduction of flow-induced noise generation, propagation and transmission, 2020.

An all-in-one wind tunnel

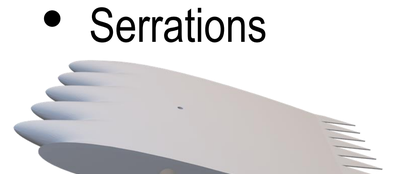


- Open-loop wind tunnel
- 20 m/s free stream velocity
- Acoustically treated to minimize fan noise and reduce spurious reflections
- Sliders to highlight effects of:
  - inflow turbulence
  - noise reduction technologies at source and during propagation/transmission
- Amplification system to promote perceptive experience
- Training laboratory

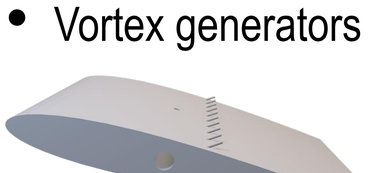
Noise mitigation technologies

AT THE SOURCE

- Ref. / Tip noise



- Porous LE/TE



- Serrations

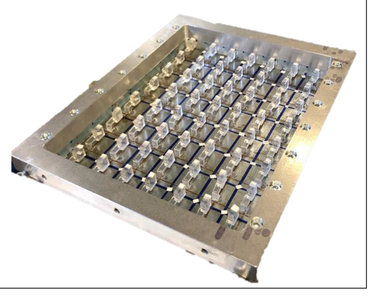
- Vortex generators

DURING PROPAGATION

- Passive liners
- Active liners

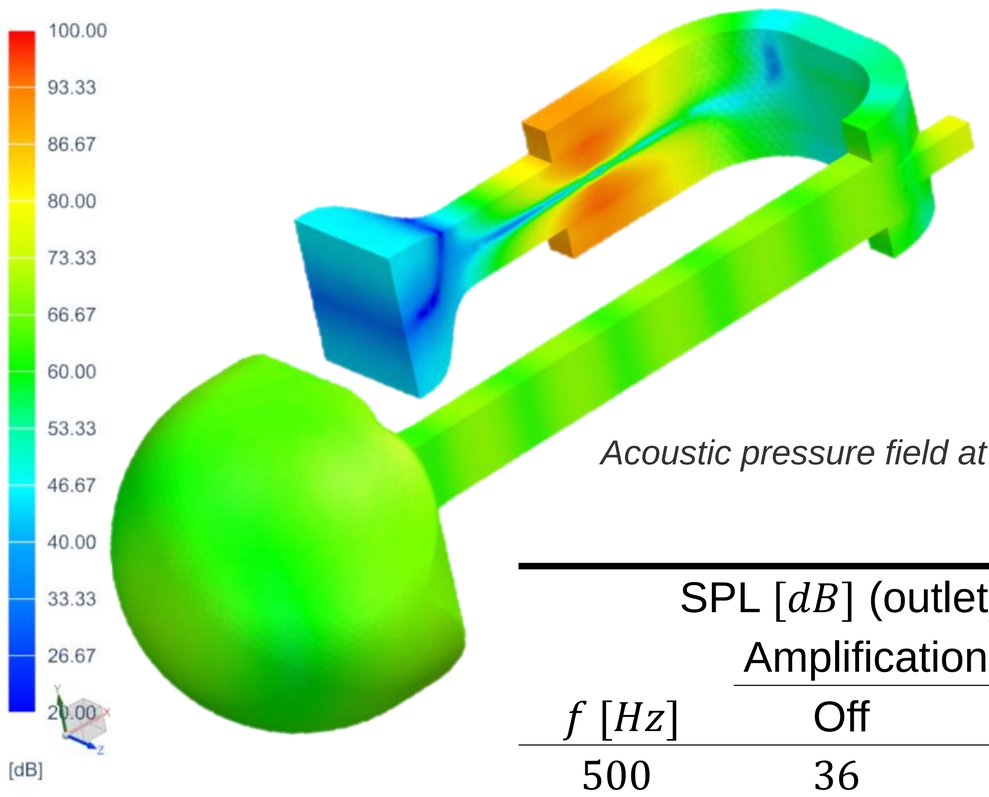
DURING TRANSMISSION

- Architected metamaterials



Digital twin

- Support design wind tunnel
- Numerical test bench to model current and future noise reduction technologies
- Numerical training platform



Acoustic pressure field at 500 Hz.

SPL $[dB]$ (outlet)	Amplification speaker	
$f\ [Hz]$	Off	On
500	36	78
1000	22	69

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