



Technologies and effects that are considered:

- *Liner (3-D printed, active and passive concepts, plasma devices)*
- *Meta-materials and dissipative surfaces*
- *Shielding effects*
- *High lift devices (HLD) noise*
- *Jet installation noise*
- *Boundary layer ingestion effects (BLI)*
- *Landing gear installation effects*
- *Distributed electric propulsion (DEP)*

Assessed through:

- Dedicated experiments
- Analytical and low-order models, high-fidelity simulations
- Tools benchmarking and use of common experimental facilities

Embedding novel noise reduction technologies in future aircrafts

The ambitious target in ARTEM consists of providing detailed configurations for a tube-and-wing configuration with semi-buried engines (building on the NOVA concept of ONERA) as a representation of a possible 2035 configurations as well as two blended-wing configurations anticipated for 2050 for short (REBEL) and long range (BOLT). The detailed analysis includes the characterization of the main noise sources of these aircrafts, in order to identify the low noise technologies most appropriate for the noise reduction.

Finally, the new concepts will be assessed with the technologies needed for the best noise reduction.



A possible candidate for 2035 air transport: ONERAs NOVA concept with semi-buried engines (@ ONERA, 2015)

ARTEM partners:



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Key objectives:

The project **ARTEM** was set up in order to help **closing the gap between noise reductions obtained by current technologies** - as already applied or being matured in large technology projects such as OpenAir and CleanSky - and **the long-term goals of ACARE**.

With the expected advent of novel configurations as advanced tube-and-wing concepts with lift-producing fuselage and embedded engines or even blended wing body aircrafts, novel approaches are needed to make best use of noise reduction technologies at the source – i.e. at the aircraft itself. This involves the **reduction of noise originating from the interaction of different aircraft components** - e.g. the jet of the engine with the wing or other aircraft surfaces. Furthermore, **innovative means** for the **absorption of noise and the deflection of noise** away from the people below the aircraft are developed.



The aim is to **develop** those “**Generation 3**” **noise reduction technologies (NRTs)** to a technology readiness level (TRL) of 3 (experimental proof of concept) to 4 (technology validated in lab).

In a **multi-channel assessment and exploitation strategy** for the technology development of the project, predictions will be made when these novel technologies are applied to current and future aircraft concepts. Thereby, fly-over predictions and even auralization of the still virtual aircrafts will be possible.



ARTEM gathers 24 partners from 10 European countries (incl. Russia):

- 8 research centers
- 8 universities
- 4 major companies of European aerospace industry
- 4 SMEs



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“Aircraft Noise Reduction Technologies and Related Environmental Impact”



The ARTEM logo, featuring the word 'ARTEM' in a large, green, sans-serif font. Above and below the text are several curved lines representing sound waves, with the top waves pointing towards the text and the bottom waves pointing away from it.

The Enabler Project for Generation 3 Noise Reduction Technologies

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