

## New EU project

VOLVO AERO IS INVOLVED in a new eu project initiated in May. NEWAC (New Aero Engine Core Concepts) aims to reduce aircraft engines' fuel consumption by 6%.

The project aims to develop technology for future engines by using heat exchangers, for instance to refrigerate the cooling air in the turbine. Volvo Aero will design the engine structures that these heat exchangers will be integrated into.

"The engine normally takes air from the compressor, which reaches temperatures of up to 600°C. Because the temperature of the inlet air to the turbine is approximately 1,500°C, the hot air for the compressor can be used for cooling. But if we conduct the hot air from the compressor into a heat exchanger, the temperature drops, making the cooling more efficient. The more temperature is reduced, the lower the fuel consump-



**Anders Lundbladh is involved in the NEWAC project .**

tion," explains Anders Lundbladh, NEWAC's coordinator at Volvo Aero in Trollhättan, Sweden.

The project is headed by MTU Aero Engines in Germany. 41 European industries, universities and colleges are involved in this collaborative project.

"We aim to complete the project in 2010. After this, it will take many more years before we see the results in civil aviation," says Lundbladh.

**NEWAC ALSO AIMS** to reduce emissions of nitric oxide, a pollutant that produces acidity and contributes to the greenhouse effect.

NEWAC is part of the eu's sixth framework programme, and consequently receives roughly 50% of its funding from the industry and the other 50% from the eu. The project will cost a total of eur 75 million.

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ANDERS LUNDBLADH, ENGINE SYSTEM EXPERT AT VOLVO AERO IN TROLLHÄTTAN, SWEDEN

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**MOST PEOPLE EXPECT** the next generation of small short-distance aircraft in the 150 passenger size class to start flying around 2013. This forecast is based on the expected replacement of faithful old models such as the Boeing 737 and the Airbus 320 family.

Both airlines and the surrounding world will place tough demands on these aircraft’s successors. They will need to be more robust, more fuel-efficient, cleaner and quieter than today’s machines.

“This trend places focus on things that we’re already good at,” says Robert Lundberg, marketing manager at Volvo Aero in Trollhättan, Sweden.

The European aeronautical research cooperation has drawn up a set of objectives for aircraft’s technical performance by 2020. These objectives include cutting fuel consumption and noise levels by 50%.

Although we can’t expect this vision to be achieved by 2013, society expects some significant steps in the right direction. The new planes with represent a significant share of the market – today’s equivalents represent 50% of the volume and 30% of the value of civil production.

“It’s vital for us to get into this segment,” says Robert.

### THE TREND IS IN VOLVO AERO’S FAVOUR

So what suggests that Volvo Aero’s speciality – large lightweight structures – will be in particular demand when the next engine generation starts being developed in a couple of years’ time?

Well, designers’ constant ambition to increase the fan’s size in relation to the core engine, for instance. The aim is both to improve the efficiency rating – thus cutting fuel consumption – and to reduce noise.

“Increasing the fan’s diameter automatically makes it necessary to increase the size of several of our components such as frames and fan cases,” says Anders Lundbladh, engine system expert at Volvo Aero in Trollhättan, Sweden.

“Bigger equals heavier, unless something is done. That’s the reason for our emphasis on lightweight construction. It helps engine manufacturers to implement their concepts. This means making use of new materials and production methods. Large, complex cast prod-

ucts are increasingly being replaced with forged rings with welded sheet metal details – often reducing weight by at least ten percent,” he explains.

Volvo Aero demonstrates this new competence in its new collaboration over GE’s long-distance engine, the GENx, where the rear turbine frame is manufactured in this way.

### USING THE RIGHT MATERIAL

New materials result in new manufacturing methods, for instance the use of welding techniques to deposit material directly on a surface. At best, this not only results in lighter and stronger components, but also means simpler and cheaper production. Even more exotic materials such as carbon fibre reinforced plastics and titanium aluminides could be used in aircraft engines by 2013.

But the really big technological leaps – the innovations required in order for aircraft to meet the goals for 2020 – may take a little longer. Ac-

cording to Anders, if features such as intercooled compressors, engines integrated into the wings and hydrogen gas operation are to become reality, it won’t happen until two generations from now.

However, one exception is already on the drawing board. American engine manufacturer Pratt & Whitney is building a demo engine with a gear reduction fan.

This design allows larger and slower fans to be used than in today’s engines, where the turbines and fans rotate at the same speed. Significant reductions are expected in fuel consumption and noise.

If the project is successful, this technology may be included in the engines flying in 2013. This would mean a big advance in aviation engine technology.

### THE FUTURE

In Europe, much of the technological development happens under major EU-funded research projects. In this field too, Volvo Aero collaborates with actors who could later become either partners or deadly competitors on the market.

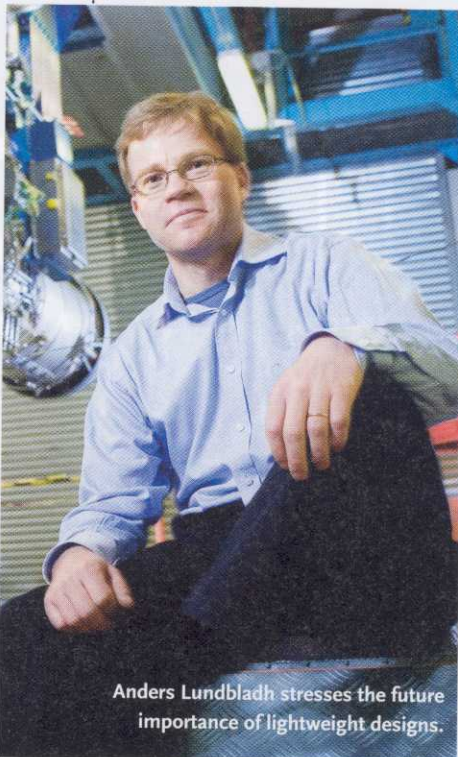
“These projects are not only important to us from a technical development perspective – they also serve as arenas where we can demonstrate our knowledge and expertise,” says Arne Johansson, manager of the company’s project to develop the next engine generation at Volvo Aero in Trollhättan, Sweden.

“It’s a bit like a school dance. Volvo Aero doesn’t want to be a wallflower – and should preferably dance with several different partners,” he says.

But the company isn’t sitting around waiting to be asked to dance. It aims to participate in developing the new engine concepts right from the start.

“The trend is the same as in the car industry. Major suppliers are contributing their own knowledge at an increasingly early stage and taking increasing responsibility for the end product,” says Arne Johansson.

Volvo Aero joined in the collaboration over the GENx engine as a so-called risk and profit sharing partner. We aim to do the same with the next engine generation. ◀



Anders Lundbladh stresses the future importance of lightweight designs.

PHOTO: NIKLAS BERNSTONE