GKN takes wing at Airbus Filton and boosts Power8
BUSINESS P22

RESEARCH ROB COPPINGER LONDON

Honeycomb alloy cuts engine noise

EADS and Georgia Tech now looking to find cheaper alternative to nickel in material able to absorb sound

Multifunctional load-bearing engine structures that absorb sound are the goal of research being funded by EADS North America at the Georgia Tech Research Institute.

After almost two years of study, Georgia Tech researchers have succeeded in producing a nickel-based alloy that has a honeycomb-like structure that dissipates sound waves as they travel through the porous material.

Now, the institute and EADS are discussing possible follow-on work looking at cheaper alternatives to the nickel alloy.

The nickel alloy was chosen as it is a common, robust alloy that would enable the sound dissipation theories to be tested.

The sound's dissipation is caused by viscous shear, in which oxygen and nitrogen molecules in the air carried by a sound wave suffer friction as they pass through the honeycomb's micron-scale diameter tunnels, reducing the pressure and, thus, the decibel level.

"The further work could also aim to look at how much noise reduction this could deliver [for the overall engine system]," says Georgia Tech research engineer Jason Nadler.

The strength of the metal honeycomb means that it could be a load-bearing structure while retaining its low density. The nickel alloy has a density of about 9 grams per cubic centimetre, but Nadler wants lower densities. "We are trying to reduce that [density] by 75% or 90%. That is the goal," he says.

Noise has previously been absorbed by foams and other cellular materials whose cavities dissipate a sound wave's energy. This process is limited by the need to have as many sizes of cavities as there are sound frequencies to be dampened. ■

CONTRACT ROB COPPINGER LONDON

R-R paid to Invent new subsystems

Rolls-Royce has been awarded a $690,000 contract by the US Air Force Research Laboratory for its Integrated Vehicle Energy Technology (Invent) component and subsystem development programme.

The UK company's US LibertyWorks subsidiary will design and develop a Robust Electrical Power System (REPS) for what the USAF describes as a future "energy-optimised aircraft".

Goals for REPS include increasing fuel efficiency and power capability, reducing lifecycle costs, generating less heat and enabling an electricity capacity that can meet the expected higher demands of future on-board systems.

Such aircraft will be more electric than today's by using electrical actuators in place of hydraulics for control surfaces and gears and being armed with directed energy weapons such as microwave beams.

"We are delighted to have been chosen to develop one of the critical Invent subsystems. We are closely working with airframe primes to provide an integrated power solution that will be compatible not only with existing jet engines, but will also support next-generation aircraft," says LibertyWorks' chief operating officer Phil Burkholder.

Invent's next steps will involve an assessment of the critical technologies and integrated ground demonstrations of an architecture for the "energy-optimised aircraft". ■

Urban Aeronautics

The ducted fan Mule UAV prototype should start hover tests in April

UNMANNED AIR VEHICLES ARIE EGOZI TEL AVIV

Mule 250kt cargo variant in early development

Urban Aeronautics has started windtunnel testing of a 250kt (465km/h)-capable cargo variant of its new 100kt top-speed Mule ducted-fan unmanned air vehicle.

The company says that the decision to carry out the 250kt variant's early development work is the result of discussions with potential customers. But the high-speed version lacks some of the advantages of the 100kt model, which could be used for medical evacuation missions and has the advantages of relative mechanical simplicity and easier carriage by Sikorsky CH-53 and Agusta-Westland AW101 helicopters.

Urban has not decided if it will start full-scale development of the 250kt variant. All efforts are now focused on the basic Mule, the prototype for which should start hover tests in April. In December the prototype had the Mule's single Turbomeca Arriel 1D1 engine fitted and the flight-control system and its sensors are being tested on Urban's Panda vehicle – a flying scale-model testbed that has similar aerodynamic characteristics to Mule.

Urban president Rafi Yoeli told *Flight International* the Mule's biggest advantage over traditional helicopters are its internal rotors: "The lack of exposed rotors eliminates the danger of rotor strikes and risk to ground personnel while the vehicle is on its autonomous approach and departure."

With a payload of 318kg (700lb) per single 31km (57nm) radius sortie, each Mule will be capable of delivering about 3,180kg over 24h, including the ferrying on return trips of casualties where medevac flights are needed. Mule's maximum operating altitude is 12,000ft (3,660m) ■.

TRIALS

V-STAR completes windtunnel testing

Frontline Aerospace's vertical take-off and landing swift tactical aerial resource (V-STAR) unmanned air vehicle has completed windtunnel tests at the US Naval Research Laboratory in Washington DC.

The V-STAR is a ducted fan UAV that has been proposed for a naval surveillance role, emergency medical evacuation and the resupply of frontline troops with its expected maximum payload of 180kg (400lb).

Using two Rolls-Royce Model 250 series II C20B turboshaft engines, a diamond box wing and a ducted pusher propeller, the full-size VSTAR could cruise at 15,000ft (4,500m) at 288kt (155km/h) and have a range of 1,045km (565nm), according to Frontline. ■