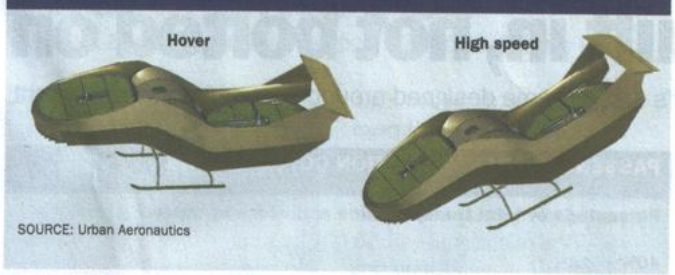
Irish Air Corps adds AW139 helicopters to its inventory
SPECIAL REPORT P35

URBAN AERONAUTICS HIGH-SPEED MULE



SOURCE: Urban Aeronautics

UNMANNED SYSTEMS **ARIE EGOZI** TEL AVIV

'Fast Mule' ducted fan UAV revealed

New 250kt-capable version designed in response to US requirement for a high-speed cargo delivery capability

Urban Aeronautics has completed initial windtunnel tests of a newly disclosed 250kt (465km/h)-capable cargo variant of its Mule ducted-fan unmanned air vehicle.

Powered by a 1,600shp (1,190kW)-class turbine engine, the design is 20% larger and 50% heavier than the Israeli company's standard Mule UAV. The new version has been designed in response to a US requirement for a high-speed unmanned cargo delivery capability, says Urban Aeronautics president Rafi Yoeli.

Data gathered during recent windtunnel testing, conducted in the USA using a subsonic facility at Penn-State University, shows that the aircraft is capable of exceeding its 250kt performance target, Yoeli says.

Urban says the larger design's performance comes mainly through the stagger built into its three main components: forward fan, centre fuselage and rear fan. It also has a horizontal stabiliser mounted at the rear of the vehicle and canted sharply upwards.

While in the hover the fans are essentially horizontal to the ground, and the UAV's vane control system and other company-patented aerodynamic and flight-control provisions enable it to take advantage of the standard Mule design's advantages in terms of safety, gust resistance and noise, the company says.

When in forward flight, the whole vehicle tilts forward so that the lift fans are acting partly as thrusters. Lift is shared between the fuselage, which takes most of the burden through a specially designed shape that interacts aerodynamically with the incoming flow and the two ducted fans, and the horizontal tail. Additional lift comes from the fans themselves.

A prototype of the baseline Mule should start hover tests in the coming weeks. ■

PATENT APPLICATION **JOHN CROFT** WASHINGTON DC

'Dynamic bumps' can reduce transonic drag

Boeing is investigating the use of oscillating jets of air on an aircraft wing to reduce drag and boost cruise speed or fuel economy in the transonic regime.

Analysis presented as supporting material for a US patent entitled "Dynamic bumps for drag reduction at transonic-supersonic speeds" shows overall mean drag reductions as high as 7.3% relative to an unmodified wing.

At higher speeds, air flowing over a swept wing is accelerated, causing drag and producing a "normal" shockwave that extends upward and outward from the aerofoil. The "dynamic bumps" system proposes a grid of oscillating jets, some that suck air and some that expel air, to create a recirculation pattern and frequency that acts to weaken the normal shock wave by creating an adjacent oblique wave that reduces aerofoil drag.

Earlier research, presented by Airbus and partners in 2004, revealed that drag reductions as high as 2.9% could be achieved with a series of concave and convex "bumps" on the wing.

Boeing notes that the static physical bumps, while indeed reducing drag during certain design conditions "at different but otherwise useful Mach number and angles of attack....can be shown to penalise the aerodynamic performance of the wing". ■

RESEARCH **ROB COPPINGER** LONDON

Onera claims 8dB noise reduction success with Anibal propeller

Flight tests have been completed with a "silent" 1.68m (5.5ft)-span propeller that French aerospace research agency Onera refers to as Anibal.

The five-blade propeller was test flown on a Robin DR400-180 R glider-towing aircraft in October last year and contributes towards research to reduce general aviation noise. The Anibal's blades are "relatively thin" and the entire propeller is made from "forged carbon", says Onera. Further research is planned for three- and five-blade propellers and a smaller diameter version for new aircraft fitted with electrical engines.

Onera says Anibal has a noise reduction capacity of 8dB and offers an efficiency comparable to current metal two-blade propellers at an acceptable production cost. The observed aerodynamic performance in glider towing appears "superior to that of the current two-blade propeller", the agency says.

This project was a collaboration between Onera, Duc Propellers, which hopes to market Anibal, French civil aviation authority DGAC and the gliding federation FFVV. ■

PRODUCT DEVELOPMENT **ROB COPPINGER** LONDON

EU aims for lean manufacturing principles at early design stage

The use of lean manufacturing principles at the earliest stages of design is the focus of a four-year, €7.6 million ($10.1 million) European Union project.

Called Lean Product and Process Development, or LeanPPD, the work is to enable the implementing of lean enterprise principles throughout the entire product lifecycle from design to disposal and reuse. A pan-industrial project with 12 members including research centres, academia and industry, its aerospace partner is engine maker Rolls-Royce.

"For an enterprise to improve performance and ultimately cost savings there is a need for the whole organisation to undergo a lean transformation. This will provide the basis for the development of a knowledge-based environment to support...sustainable and affordable products," says LeanPPD technical committee chairman and Cranfield University knowledge management course director Ahmed Al-Ashaab.

The project is funded under the EU seventh framework programme and it is being co-ordinated by Spanish research centre Labein. ■