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AFRL to set down goals for planned AD-HEETE project

Engine to use 'second-generation' adaptive technology

In the next six to 12 months the US Air Force Research Laboratory is to establish the goals for its proposed AD-HEETE project, a follow-on from its ongoing Highly Efficient Embedded Turbine Engine (HEETE) and Adaptive Versatile Engine Technology (Advent) research studies.

A 2017 engine demonstration is one target for AD-HEETE that will merge the adaptive and high-performance core technologies from its predecessor studies. The engine will use "second generation" adaptive technology that the AFRL wants to enable precise control of air temperature and its delivery to different engine parts.

Thermal management systems are another target as the heat at maximum thrust during take-off is known to play a major part in reducing the life of an engine. Aircraft spend up to 90% of their operational time at cruise, but that phase of flight produces relatively little engine ageing, owing to lower engine temperatures.

"We want an adaptive engine that reduces the temperature at

thrust for take-off," AFRL propulsion directorate turbine division chief engineer Jeff Stricker told the American Institute of Aeronautics and Astronautics' 44th Joint Propulsion Conference in Hartford, Connecticut on 21 July.

Another goal is expected to be the move from the use of nickel in

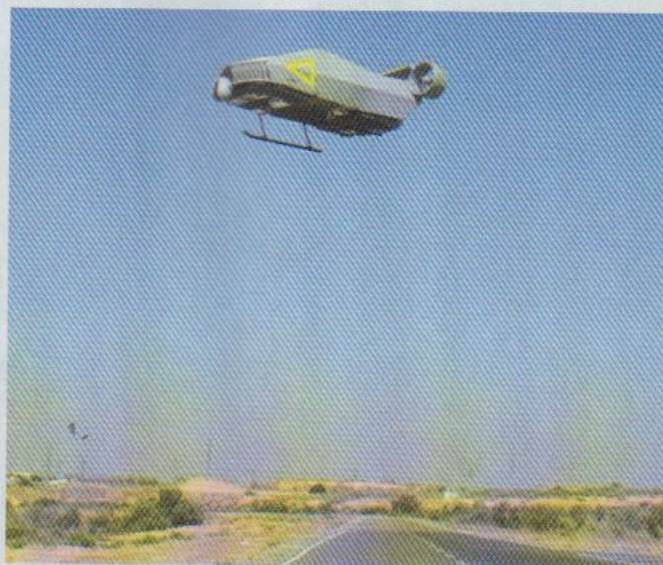
"We want an adaptive engine that reduces the temperature at thrust for take-off"

JEFF STRICKER

AFRL propulsion directorate turbine division chief engineer

the engine core components to intermetallics, which are combinations of metals that have radically different crystalline structures to their constituent materials.

General Electric and Rolls-Royce were selected for HEETE and Advent. HEETE is for engines in the 20,000-35,000lb thrust class (89-156kN) and Advent will see a demonstration engine in 2012. ■



A previous series of tests was limited to hover and slow flight

UNMANNED VEHICLES ARIE EGOZI TEL AVIV

Forward flight testing of Panda bears fruit

Urban Aeronautics has begun forward flight testing of its Panda unmanned fan craft, following a series of tests limited to hover and slow flight to gather data on the effectiveness of its patented vane control system.

According to president Rafi Yoeli, the data from the forward flight testing will be used to verify the vehicle's maximum attainable cruise speed as well as its planned endurance and range. The data from the Panda's flight testing is also being used to de-

sign Urban Aeronautics' Mule logistic support fan craft, which is a larger version of Panda designed mainly for frontline forces resupply and medical evacuation missions. The Mule's first flight is expected in April 2009.

The Panda is 1.5m (4.9ft) long and 0.8m wide. It has a maximum take-off weight of 14kg (31lb), which includes a 1.5kg useful payload. ■



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SURVEILLANCE

'World's smallest' helicopter makes maiden sortie

Prox Dynamics has achieved the maiden flight of Hornet-1, the first prototype of its advanced PD-100 Black Hornet nano unmanned aerial rotorcraft system, which the Hvalstad, Norway-based company claims is the world's smallest full authority helicopter.

Take-off, forward movement, turning and landing were demonstrated in a flight lasting more than 2min. Engineer and test pilot Pål Sandberg says: "It's surprisingly easy to fly."

Hornet-1 weighs less than 15g (0.53oz) and has a rotor diameter of 100mm (3.9in) – the same dimensions and weight as the production version – but features a much simpler avionics package. Flight control is based on a standard radio system and servos designed and developed in-house.

The rotor system is described by Prox Dynamics as a completely new design comprising a two-bladed single rotor having some inherent stability. This is controlled by the company's own PDS-2

servos, which it claims are the smallest and lightest in the world, weighing less than 0.5g.

Hornet-1 will primarily be used to verify the concept of the rotor system mechanics, gather aerodynamic data and demonstrate the operational concept to potential users.

The PD-100 Black Hornet concept is for a video camera-equipped helicopter less than 100mm long and weighing less than 20g, capable of being launched within seconds for a

closer look at a hostile area or inside a contaminated building.

The company plans to release the first version of Black Hornet in 2009, with expected volume shipments to key customers in 2010. On launching the programme in March chief technology officer Trygve Marton said: "We will develop a kind of aircraft so far only seen in science fiction movies. Potential customers will range from scientists and engineers to police, firefighters, military and special forces." ■