

# INVENTING TOMORROW'S HELICOPTER

Given skyrocketing energy costs, increasingly stringent environmental standards and heightened competition, the helicopter industry is counting on innovation to support sustained growth.

**S**afran is taking an active role in the development of next-generation helicopters. According to Jacques Brochet, Safran Vice President, Science & Technology, “This market faces three major challenges: improving flight safety, reducing operating costs, and decreasing environmental impact.” To meet these challenges, turbine engine specialist Turbomeca is taking a three-pronged approach: improve flight safety through innovative architectures and ever-higher reliability; reduce operating costs through lower fuel consumption, cost-effective maintenance, new support packages, better dispatch reliability, etc.; and reduce environmental footprint, which means cutting noise and emissions, especially carbon dioxide. “The key to the performance of modern helicopters is energy generation and efficiency”, summarizes Brochet.

## SHAPING THE FUTURE

Introduced by Turbomeca at Heli-Expo in March 2013, the new Arrano engine meets these three challenges. Its clean sheet design meant that it could take maximum advantage of the

latest technologies. Designed for medium helicopters in the 4 to 6 ton class, this unrivaled new engine reduces fuel consumption and CO<sub>2</sub> emissions by 10 to 15% versus current engines, and simplifies maintenance thanks to a highly modular design and longer mean times between overhauls. Eurocopter quickly grasped these advantages, and has already chosen the Arrano to power its high-tech X4 helicopter.

In addition to these advanced, but conventional turboshaft engines, Turbomeca is also looking ahead by studying hybrid propulsion systems in conjunction with fellow Safran company Labinal Power Systems. “The idea is to use different energy sources depending on the flight phase,” explains Jacques Brochet, «especially by combining a conventional gas turbine with an additional electrical energy source”. In other words, scientists and engineers alike are going to be very busy over the next 20 years. They will also have to look into the use of second-generation biofuels. It’s up to the big oil companies to set up a secure supply chain, while engine-makers have to adapt their turbines to use these fuels without a performance penalty. ■

## Turbomeca and X3 set record

On June 7, 2013, the Eurocopter X3 helicopter set a new speed record of 472 km/h (about 293 mph) in level flight. The X3 is a compound aircraft, adding stub wings and propellers, driven like the main rotor by its twin RTM 322 turbine engines, to a conventional helicopter airframe.



**Siim Kallas, the European Transport Commissioner and Vice President of the European Commission, visited the Turbomeca (Safran) plant in Bordes last spring to see the first ground test of the TECH 800 turbine engine demonstrator. Left to right: Jean-Paul Herteman, Chairman and CEO of Safran, Olivier Andriès, Chairman and CEO of Turbomeca, Laurent Mazoué, Vice President, Manufacturing Operations at Turbomeca, and Siim Kallas.**

## Helicopters in a Clean Sky

Launched in 2008, the European research program Clean Sky aims to develop even greener technology solutions for aviation. Efforts at Turbomeca focus on the TECH 800 technology demonstrator, developed in partnership by ten European countries. It was used to validate the technologies for CO<sub>2</sub> emission reductions used on the new Arrano engine. It also paves the way for a series of demonstrators - eco-designed engines, airplanes, helicopters, parts and systems - that will be completed in 2015. And the proven technologies will then be incorporated in products that will hit the market in 2016 and beyond, to meet the ambitious goals of the European aviation industry.