Aerodynamic Design Optimisation of a Helicopter Fuselage including a Rotating Rotor Head

Fact Sheet

Project Information

ADHERO

Grant agreement ID: 270563

Status
Closed project

Funded under
FP7-JTI

Overall budget
€ 825 000

EU contribution
€ 618 750

Coordinated by
TECHNISCHE UNIVERSITAET MUEENCHEN

Germany

Objective

The project is aimed on reducing the aerodynamic drag of light weight class helicopters by shape optimization of components which typically produce a large amount of aerodynamic drag. Both experimental and numerical simulations are conducted on a helicopter fuselage configuration with rotating rotor head. The main effort is on three wind tunnel campaigns analyzing the aerodynamic characteristics of the baseline configuration and of three modified configurations. The design modifications concentrate on the landing skids and on the rotor head to reduce the aerodynamic drag associated with these components. Effects of spoilers, strakes and vortex generators are addressed as well to influence the fuselage wake for further drag reduction. In order to create a detailed data base, the wind tunnel experiments include force measurements to obtain aerodynamic forces and moments, pressure measurements to capture steady and unsteady surface pressure distributions and field measurements of mean and fluctuating velocity components for
distributions and field measurements of mean and fluctuating velocity components for wake analysis. A new wind tunnel model consisting of fuselage, tailboom segment and rotating rotor head will be designed, manufactured and instrumented to conduct the wind tunnel tests. The model will provide high modularity of its components to exchange them easily for shape modification with respect to drag reduction. The experimental tasks are supplemented by computational fluid dynamics work to numerically cross-check the wind tunnel data for selected cases.

Field of science

/engineering and technology/mechanical engineering/vehicle engineering/aerospace engineering/aircraft/rotorcraft
/natural sciences/physical sciences/classical mechanics/fluid mechanics/fluid dynamics
/engineering and technology/mechanical engineering/vehicle engineering/aerospace engineering/aircraft

Programme(s)

Topic(s)

Call for proposal

SP1-JTI-CS-2010-01

Funding Scheme

JTI-CS - Joint Technology Initiatives - Clean Sky

Coordinator

TECHNISCHE UNIVERSITAET MUENCHEN

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Activity type
Higher or Secondary Education Establishments

EU contribution
€ 618 750

Website
Contact the organisation

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