IVANHOE - Installed adVAnced Nacelle uHbr Optimisation and Evaluation

Nacelles, which house the engines on an aircraft, require a complete facelift to keep up with the next generation of engines. The wider fan diameter of the ultra-high bypass ratio (UHBR) type engine – a conventional shrouded turbofan type configuration – requires a new design for nacelles. The EU-funded IVANHOE project will develop a new type of nacelle. It will use several fidelity level aerodynamic modelling tools to allow for fast iterations and the down selection of nacelle geometries and locations. Wing/nacelle interference will be taken into account. This method will be validated by wind tunnel experiments with new and advanced wind tunnel model and measuring techniques.

The introduction of UHBR engines poses new challenges on optimal nacelle design, both in geometry and in location. In response to the topic CfP09 CS2-LPA-01-67, the IVANHOE project will address this challenge, resulting in a new multi-fidelity optimisation method, validated by advanced wind tunnel experiments. A consortium of an SME, an industry, an R&D institute and 3 universities with complementary skills will produce this result in close coordination with the topic manager in 36 months, asking for a grant of € 3 514 834.

Coordinator CTH will provide the design envelope and safeguard thrust/drag performance, HIT09 and UNIPD will jointly optimise a rapid design loop to down select options. TUB will validate the resulting design options with a high fidelity CFD code, complemented by a high fidelity wind tunnel experiment of a Deharde powered nacelle model in DNW's High Speed Tunnel.

The project will advance the state of the art in nacelle design by smart use of various fidelity level aerodynamic modelling tools enabling fast iterations and down selection of nacelle geometries and locations. Wing/nacelle interference will be taken into account. This method will be validated by wind tunnel experiments with new and advanced wind tunnel model and measuring techniques.

The result of the nacelle optimisation for an UHBR installation on the Common Research Model will be delivered in full compliance with the call. Moreover, IVANHOE's will provide an improved design method, tools and facilities for use by the European aviation industry for future aircraft projects, unlocking the full potential of CO2 reduction of UHBR engines while increasing competitiveness by reducing costs for design and testing.

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Total EU Contribution: Euro 3.514.833,75

Call ID: H2020-CS2-CFP09-2018-02

Project Duration in months: 36

Start Date: 01/10/2019

End Date: 30/09/2022

Find out more: **https://cordis.europa.eu/project/id/863415**