

Success Story : INCAS participation to EU JTI Clean Sky



JTI “Clean Sky” is the European aeronautics industry's response to citizens’ needs for more environmentally friendly aviation in combination with sustained economic growth. This seven-year research program will combine public and private capacities to rapidly introduce advanced technologies for the next generation of aircraft. The aim of these new technologies is to radically reduce noise and emissions in air transport and reduce aircraft fuel consumption. The Clean Sky program will speed up the path from research to industrial application of innovative, greener technologies.

Clean Sky is built upon six different technical areas (ITD) – from innovative rotor blades and engine installations that reduce noise and fuel consumption, to ecologically friendly designs that help components last longer and use fewer non-renewable resources. (Fig.1). Large-scale technology demonstrators are planned in order to validate research results both in flight and on the ground, notably in flight test vehicles created expressly for this program (Fig. 2), where INCAS is a key partner. This will enable a more rapid transition to full-scale flight tests, followed by the application of these new technologies in the next generation of aircraft.



Figure 1 – Clean Sky Project

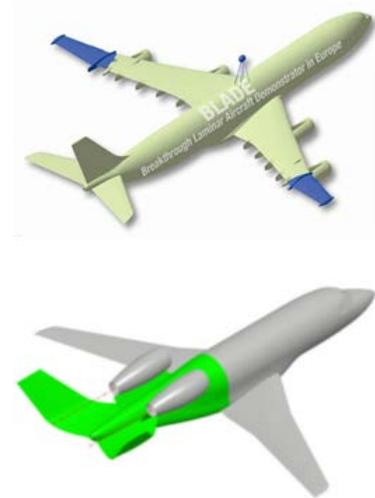


Fig. 2 Major demonstrators in SFWA

INCAS, as associated member, has a large share of activities in all areas of R&D, from low TRL to the final validation in flying BLADE demonstrator. A task force was defined at INCAS able to participate in this very challenging project. All INCAS compartments are involved in various phases of the project. Starting from 2010 the main infrastructure at INCAS (wind tunnels, mechano-climatic testing, structural testing and HPC) is deeply involved in the activities, for a 24 MEuro budget for 7 years, using an equivalent number of 89 R&D personnel per year integrated in activities at all levels.

INCAS has important responsibilities in a dual role. In low TRL activities INCAS is leader for active flow control integration in high lift systems for SRA – Short Range Aircraft (Airbus) concept and for Biz-jet low speed concept (Dassault). Most of the activities are related to the usage of Subsonic Wind Tunnel as a relevant environment for demonstration of the oscillatory blowing concept. At the same time, as part of GRA – Green Regional Aircraft ITD, INCAS is supporting Alenia in development of low noise configurations for the regional transport aircraft under development, mainly with respect to novel technologies for airframe noise control in landing configurations using innovative side edge fences on the flaps (Fig. 3).

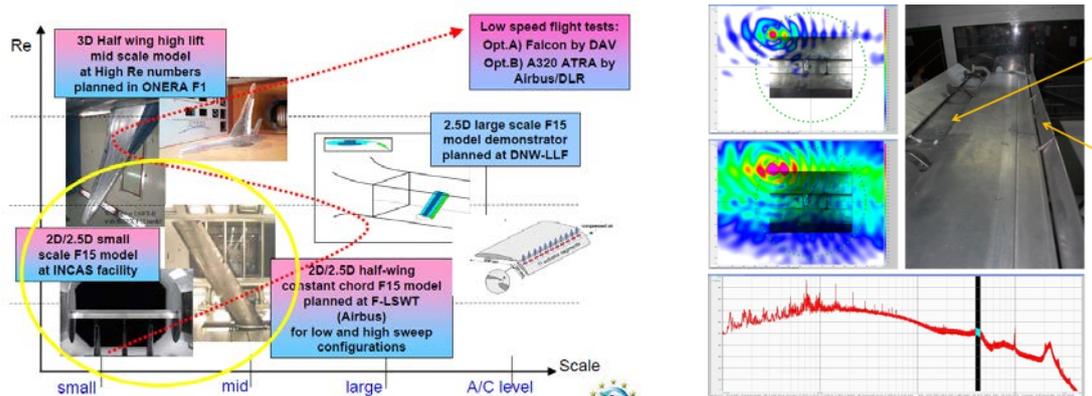


Fig. 3 – INCAS activities for active high lift systems and airframe noise evaluation

A very special interest for low TRL activities is the exploitation of a patent on piezoelectric synthetic jets and associated technology for buffeting control using fluidic interaction behind the shock wave. This activity is performed with ONERA and FOI on an optimized wing for passenger aircraft of Airbus interest, using INCAS Supersonic Wind Tunnel (Fig. 4).



Fig. 4 – Buffeting alleviation technology demonstrator in INCAS Supersonic Wind Tunnel

In high TRL activities, INCAS is successful in maturing a Krueger flap concept for the biz-jet thin wing. The patent will also be incorporated in future activities on a hybrid laminar wing for Airbus in AfloNext project, in FP7. This is strongly linked with INCAS unique capability demonstrated for harsh environment testing capabilities for fluidic actuators, towards qualification and certification, performed with Fraunhofer and TUB in a dedicated test rig at INCAS.

BLADE (Fig. 5) is by far the most relevant implication of a Romanian R&D company in a EU project in aeronautics. DOA capability at INCAS and integration with ROMAERO and AVIOANE Craiova is a major asset of the Romanian cluster that enables the possibility to the industry to reintegrate at prime level in aeronautics.



INCAS has already achieved important IPR on technologies with huge potential in respect to green technologies, to be used in the new generation of aircrafts in 20 years from now. This enables a solid strategy for industrial technological transfer, at highest industrial level in aerospace.