



Dr Rafic Ajaj

Industrial Fellowships Scheme

Dr Rafic Ajaj is a lecturer in aerospace structures within the Faculty of Engineering and the Environment at the University of Southampton. From 2015 to 2016, he used the Royal Academy of Engineering's Industrial Fellowships Scheme to work on a collaborative project with Airbus Operations Limited on folding wingtips for transport aircraft.



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“My industrial fellowship gave me the opportunity to work with a large industrial partner and establish strong links that boosted the momentum of my research.”

RESEARCH

Folding wingtips on aircraft enable the development of aircraft that have increased wingspan in flight, while maintaining aircraft width on the ground so that they continue to fit in airport gates. Efficiencies in flight performance can also lead to lower fuel consumption, noise and emissions.

Dr Ajaj’s research investigates new ways to develop this morphing technology. His industrial fellowship with Airbus provided an ideal opportunity to look comprehensively at different wingtip systems and configurations and understand their impact on flight mechanics.

Through his collaboration with engineers at Airbus, Dr Ajaj developed a semi-active folding wingtip device that alleviates gust and manoeuvre loads in-flight.

While Airbus has collaborated previously with other universities and researchers on folding wingtips, Dr Ajaj was able to bring much of this together by developing an adaptive mechanism that integrated all the functionalities of folding wingtips into one semi-active device.

IMPACT

Airbus has filed patents in both the UK and USA for the semi-active folding wingtip device developed during Dr Ajaj’s fellowship and there are plans for the relationship to continue. He is currently working with Airbus engineers on several research proposals and grant applications.

The fellowship has also had a direct impact on his undergraduate teaching. “The experience I

gained at Airbus has helped me introduce new real life examples in my mechanics of flight module,” Dr Ajaj explains. “This will benefit our students and help them visualise the bigger picture and enhance their learning experience.”

PROFESSIONAL DEVELOPMENT

Dr Ajaj recognised that a collaboration with an organisation such as Airbus would improve the visibility and impact of his research. Airbus is a world leader in the design and manufacture of transport aircraft and he now has a significant network of contacts there.

“Airbus engineers are now more aware of my expertise and capability and they are very keen to pursue the work on folding wingtips with me,” he says.

Airbus is keen to identify further opportunities to host Dr Ajaj on site and is supporting him in a Fellowship application that he hopes will enable him to develop his ideas further and build flying prototypes.

INDUSTRIAL FELLOWSHIPS SCHEME

The Industrial Fellowships Scheme provides an invaluable opportunity for early- to mid-career academics to undertake a collaborative research project in an industrial environment. The scheme aims to strengthen the strategic relationship between the university and the industry host by providing an opportunity to establish or enhance collaborative research between the two parties and enhance the quality of teaching.