The problem of rotor-fuselage interaction is central to the design and performance analysis of helicopters. Regardless of this significance, the problem has so far been addressed by very few authors, mainly due to the difficulties associated with both experimental and computational techniques when such complex configurations are considered.

The objective of this study is to develop and validate, computational tools suitable for rotor-fuselage engineering analysis. Computational Fluid Dynamics will be the main tool with experiments playing a key role in the validation of the method. The Helicopter Multi-Block solver [1, 2] was the basis for this work.

As a starting point the well-known ROBIN model [3] fuselage was considered first in isolation and subsequently in combination with the 4-bladed HIMARCS rotor. Good agreement with available experimental data [3] has been obtained provided adequate discretisation grids were used suitable for full viscous computations. The figure below shows the ROBIN body combined with the 4-bladed HIMARCS rotor. Preliminary results have been obtained and are shown below for this configuration at $\mu = 0.25$.

Detailed results of this study will be presented at the meeting.

![Figure 1: Robin fuselage, HIMARCS rotor: $\mu = 0.25$, fixed blade pitch, 1.5 $M$ grid points (1.1 $M$ rotor, 0.4 $M$ fuselage).](image)

Acknowledgements
This work is supported by the EC 6th Framework Project GOAHEAD.

References