Integration of advanced aerodynamics in comprehensive rotorcraft analysis

From 1998-03-01 to 2000-05-31

Objective

Objectives and content:

The primary objective of this proposal is to develop a unique integrated rotorcraft simulation system for the improved analysis of the aerodynamic, aeroacoustic, and aeroelastic performance of rotors. There is a strong industrial need within the European rotorcraft community for a unique rotorcraft simulation system able to integrate advanced aerodynamics codes with the comprehensive aerodynamics codes available to European manufacturers in order to incorporate more accurately the aerodynamics of advanced rotors in global simulations. The advanced aerodynamics codes will also provide the high quality aerodynamics data needed by the latest generation aeroacoustics codes. In order for the European Rotorcraft community to compete against its US counterpart, advanced aerodynamic, aeroacoustic and aerelastic codes have to be integrated in an efficient and user-friendly simulation system. This is the only solution, which will allow Europe to keep an important share of today's global rotorcraft market. At the end of this collaborative research, there will be a significant improvement in the capabilities of the European rotorcraft manufacturers to design and analyse configurations. The simulation system will allow the designer to efficiently examine effects due to changes in the geometry upon the aerodynamic, aeroelastic and aeroacoustic performance of a rotor from within an integrated and user-friendly environment. Furthermore, such a capability will allow the design of next-generation rotors having: improved pilot control loads, reduced vibratory loads, increased speed and lower noise emission. The proposed research on the joint development of an integrated rotorcraft simulation system will further improve the European collaborative technology research capability, increase the cohesiveness of the European industry, and, considerably reduce both the development costs and time required if each individual rotorcraft manufacturer was to produce its own system.

Furthermore, the development of an integrated rotorcraft simulation system will allow the European rotorcraft manufacturers to significantly improve their design and development capabilities and enable them to bring advanced products to the market at considerably reduced timescale and cost. The lack of technological upgrade of European comprehensive codes clearly put at risk the competitiveness of European rotorcraft manufacturers in today's global market. It is therefore of the utmost importance that Europe develop a rotorcraft simulation system which will allow each manufacturer to use its in-house comprehensive code, which is not only deeply rooted in the manufacturers tradition but also in its development cycle, while taking full advantage of the advanced aerodynamics and aeroacoustics codes developed through EU-funded projects. It is expected that the proposed rotorcraft simulation system will become a standard in Europe and will allow the European rotorcraft community to fully capitalise on the efforts dedicated to past and recent EU-funded projects. The main innovation of the ROSAA system is that, for the first time in Europe, a common integrated rotorcraft simulation system is proposed which will be able to really address the multidisciplinary rotorcraft problem. BE97-4055
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Subjects