

ACCENT - Adaptive control of manufacturing processes for a new generation of jet engine components

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ACCENT addresses the relevance to the call 7.1: "Aeronautics and Air Transport" by "Improving Cost efficiency" and quality of safety critical aircraft engine components. The manufacture of safety critical rotating components in modern aero engines is by nature very conservative. In order to achieve the required engine performance, thermal and mechanical stresses are pushed to the maximum, which in turn leaves the choice of materials to exotic super alloys. These materials are classed as difficult to machine under normal circumstances, but when added to the changes in mechanical properties which occur naturally from part to part, consequently variable and often unpredictable tool life, and the ever present possibility of random and unexpected process anomalies, machining processes can never be fully optimised. Stringent legislative controls are placed on safety critical component manufacture to ensure that parts entering service will function correctly and safely to a declared service life, and in declaring the service life for such a part, the machinability issues stated above have to be taken into consideration. Hence manufacturing process parameters are often reduced or tools are changed early to ensure part surface integrity. The industry method adopted, is to "freeze" to process following process qualification to first article inspection, and successful part validation via laboratory examination and testing. Once frozen, no changes to process parameters are permitted without time consuming and costly re-validation. ACCENT will allow the European Aero Engine manufacturers to improve their competitiveness by applying adaptive control techniques to the manufacture of their components. Being able to adapt the machining process to the constantly changing tool and component conditions whilst operating in a multi-dimensional "approved process window", processes will be optimised to the prevailing conditions and no longer "frozen".

Coordinator

ROLLS ROYCE PLC (United Kingdom)

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ECOLE NATIONALE D'INGENIEURS DE TARBES (France)

APR SRL (Italy)

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Start date 01/07/2008

End date 30/06/2011

Duration 36 mesi

Project cost 6.63 million euro

Project Funding 4.25 million euro

Subprogramme Area Production

Contract type Small or medium-scale focused research project