

## SUMMARY

Titanium alloys are difficult to machine. In order to improve their machinability, the chip formation process of the  $\alpha$ - $\beta$  alloy Ti6Al4V has been studied in detail by in-situ observation of high-speed cutting experiments, metallographic analyses of chips including TEM and Finite Element Simulations of the cutting process. From the results of these investigations, promising alloy modifications have been developed. In the research activities within this project, parameters for the industrial production of the new alloys are investigated, namely, the deformation parameters as well as the mechanical, physical and chemical properties and their dependence on the lanthanum content. Additionally, it has to be clarified if nanoparticles exist in the Titanium matrix due to the different thermo-mechanical treatments.