Abstract
We designed and successfully manufactured a complex experimental piece composed of surfaces with zero, positive and negative curvatures. We planned and executed the machining manufacturing process by using milling process with end ball nose tools on a vertical machining center equipped with a fourth external rotational axis. For planning, simulation and verification of the machining process, we developed a virtual model of the machine tool and its accessories in a commercial system for computer-aided machining. By mounting the virtual manufacturing system, we verified the process and adjusted it until observe a good performance. We tested and confirmed the advantages of using the recent virtual methods for simulation and verification of the process offered by various computer-aided machining systems, especially when dealing with complex processing components in machine tools with more than three axes.

Keywords
Virtual machine tool, process planning, complex parts machining, processes simulation and verification, multi-axis machining.