New product functionalities through advanced surface manufacturing processes for mass production

The proposal should address surface-modifying methods which do not alter the chemical composition of the surface or add an extra layer of a different material, for example: micro-machining, texturing, photon-based technologies, laser, mechanical treatments, etc. These methods should be used to create new manufacturing processes that can be applied on mass production lines. Due to the need for cost-effective technologies, these processes should be easy to integrate within the existing manufacturing plants and cost-effectiveness should be demonstrated. The research activities should be multi-disciplinary and address all of the following issues:

• Development of cost-efficient, up-scalable and adaptable surface processing techniques that introduce micro- or nano-scale modifications at the surface level of the part providing it with specific properties or capabilities.
• Design and implementation of specific methods and systems that enable highly efficient up-scaling of the developed processing techniques from laboratory scale to real scale, with a specific objective to apply the processes for mass production.
• Implementation of modelling tools to support selection of the processing parameters that lead to the targeted surface modifications.
• Solutions which are economically viable, environmentally friendly and easy to transfer to other fields than the demonstrated fields of application.
• In-process inspection and monitoring possibilities to ensure that the final results remain within the quality requirements.

The projects are expected to cover applied research but also demonstration activities, such as testing a prototype in a simulated operational environment. The
The developed innovative product functionalities should lead to a remarkable impact for both producers and users, in the following terms:

- Cost increase pertaining to those functionalities integrated into products should be below 10% with respect to the cost of conventional products.
- The improvement in the product performance should be above 20% in the targeted functionalities such as: surface friction (increase or decrease), wear resistance, surface energy, corrosion and thermal resistance, hardness, self-cleaning properties, conductivity, anti-fouling, catalytic properties, etc. Besides, the improvement can also consist in obtaining tailored optical properties including for aesthetic or functional purposes.
• Strengthened global position of European manufacturing industry through the intensive implementation of innovative and unconventional technologies along the European manufacturing value chain.

Proposals should include a business case and exploitation strategy, as outlined in the Introduction to the LEIT part of this Work Programme.