Steel is steel the basic construction material in the automotive industry. During last half of the century the research on development of steels led to few significant developments, which were milestones on the way to improvement of in-use properties of car parts. Such inventions as grain refinement by adding microalloying elements, hardening by precipitation and introduction of multiphase steels should be mentioned. In this last case combination of soft ferritic matrix with hard inclusions of bainite, martensite and retained austenite allowed to obtained structures resembling composite materials and to improve noticeably strength and ductility. In consequence, increase of passengers safety and decrease of the weight of cars was possible. The leading steels with multiphase structure are Dual Phase (DP) and Complex Phase (CP) steels. The latter compose ferritic matrix with martensite islands (<30%).

Recent research has shown that further significant improvement of properties is possible when large gradients of properties are avoided. These large gradients in DP steels cause stress concentrations, which lead to initiation of microcracks and decrease of the local formability. Thus, the objective is to obtain microstructures, in which various hard constituents (various types of bainite, martensite, retained austenite) appear in the soft ferrite. Design of such phase structure, which gives the best properties, is a challenge for the scientists. Experimental research in this field is expensive and support by numerical modelling is desperately needed. The fact that objective microstructure is not characterized by deterministic number but by distribution functions is the main difficulty in modelling. Thus, the objective of the project was formulated with the above comments in mind. Development of the model based on distribution functions is the main goal. The model should describe evolution of the distribution functions during processing. To reach this goal the distribution functions describing dislocation density, grain size and volume fraction of phases will be developed. Identification of these functions will be performed using inverse solution for the experimental data obtained by the project partner RWTH Aachen. Developed model with distribution functions will be used to design manufacturing process which will give required distribution of properties in the final product.