The scientific goal of the project is to obtain new basic information of the process of chemical homogenization of liquid steel enriched with alloy additions in a flow reactor of the tundish type with the use of the pulse–step method. Thus obtained information will supplement the existing knowledge in the alloying of liquid steels. The basic problems to be solved within the submitted project are: the effect of the density of alloy additions on the process of their mixing with the liquid steel; the effect of the non-stationary conditions and the modification of the working geometry of the flow reactor on the steel alloying process, and; the description of the behaviour of the alloy additions in the continuous medium in the location of process initiation, especially under non-stationary conditions. Within the framework of the project under implementation, the following studies will be carried out: validation of numerical model for pulse-step method of liquid steel alloying, numerical simulation of alloys and metals behaviour during liquid steel alloying process for pulse-step method, optimisation of continuous medium alloying pulse-step method, physical simulation of alloy additions behaviour in the continuous medium during alloying process, physical simulation of liquid steel alloying process during unsteady conditions and numerical description of chemical homogenisation process in the multi-outlets tundishes for pulse-step method. Introduction to the Fe-C-X system: Si, Mn, Al and Nb, Ti, V, B allow the ultimate tensile strength and ductility of steel to be increased at the same time. Therefore, multiphase steels of the TRIP, DP, MART and CP are the steels of the future. The group of elements enjoying special interest includes also Ca and Ba, which, if introduced in a pure form, enable the modification non-metallic inclusions and the removal of oxygen. Alloy additions based on Si, Mn, Al, Ti, Ca and Ba show strong affinity to oxygen, slag constituents and refractories. For this reason, the main objective of developing an innovative method of introducing an alloy addition to steel at the continuous steel casting process is to reduce to a minimum the losses caused by its oxidation or reaction with other components of the heterophase system. In view of the above, introducing an alloy addition to liquid steel contained in the tundish immediately prior to its flowing into the mould will ensure that the alloying process will be conducted under stabilized conditions in order to achieve the projected effect in the form of a correction to the composition of the iron-alloy grade being cast or a modification of the chemical composition of non-metallic inclusions. So, seeking for new solutions concerning the introduction of alloy additions to liquid steel, which will have an outlook for implementation in an innovative economy is fully justifiable.