Optical atomic clocks are rapidly developing instruments (installations), which significantly outperform traditional microwave atomic clocks (as rubidium or cesium clocks) in terms of stability and accuracy. The output signal of optical clock is a light which frequency (being in the range of 200 - 500 THz) is extremely stable and accurately defined, with relative uncertainty usually below 10^{-17}. This unprecedented quality of frequency signal opens new areas of research and development in pure and applied science (among others in fundamental physics, relativistic geodesy, astronomy, spectroscopy), metrology (planned redefinition of SI unit - second) as well as in technology (navigation, next generation telecommunication etc.)

Impressive development of optical atomic clocks revealed the problem of locality of the produced frequency reference, which cannot be easily sent outside the laboratory operating the clock, without severe quality degradation. This limitation seems to be a dominant factor slowing down the further progress in clocks development and their wide exploitation in science and technology. The relatively matured technology for transferring optical frequency at the level of accuracy demanded by optical clocks is based on using dedicated optical fibers, and arranging special noise cancellation setups for mitigating the propagation perturbations occurring during the signal transmission. However, the real access to dedicated fibers is severely limited and/or extremely expensive.

The research undertaken in this project is oriented on developing means (both signal processing algorithms and hardware devices) allowing to transfer the optical frequency of the state-of-the-art clocks via standard optical telecommunication networks, nowadays present practically at all academic and technology centers. The successful realization of the project will path the way to widespread access to the frequency reference with accuracy of 17 decimal digits, i.e. with relative uncertainty of 0.00000000000000001 or below.