

OPTIME – time and frequency dissemination system based on fiber optical network – PIONIER

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We describe the current stage and perspectives concerning using the optical network for time and frequency dissemination in Poland. In the first part we summarize an over-a-year continuous operation of 420 km-long connection between GUM in Warsaw and AOS in Borowiec near Poznan¹. The link is based on the fiber optic system for time and frequency dissemination, developed at AGH^{2,3}. Herein, for the first time, we are reporting over a year comparison of UTC(PL) and UTC(AOS) atomic timescales with this system, and we refer it to the results of comparisons performed by GPS-based methods, and we also address some practical aspects of maintaining time and frequency dissemination over fiber optical network.

In the second part we describe the OPTIME project (national time and frequency distribution system) which is based on the experience gained on the connection between GUM and AOS using fibers provided by PSNC (PIONIER) and TPSA, and on our other experiments⁴. We focus on general architecture created in OPTIME project.

In the last part we present the first phase of development of OPTIME system with two reference laboratories: GUM – Warsaw and AOS – Borowiec, with local repositories in PSNC – Poznan and Torun, and with the first end-users in FAMO – Torun.

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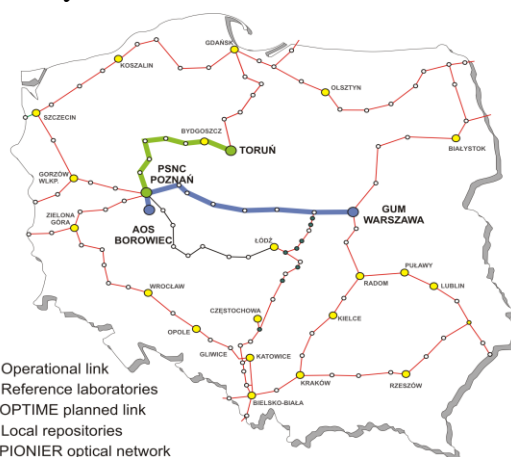


Fig. 1: National time and frequency distribution system – first phase.

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² P. Krehlik, Ł. Śliwczyński, Ł. Buczek and M. Lipiński, “Fiber optic joint time and frequency transfer with active stabilization of the propagation delay”, *IEEE Trans. Instrum. Meas.* vol. pp.61 2844–51, 2012.

³ Ł. Śliwczyński, P. Krehlik, Ł. Buczek, M. Lipiński, “Frequency transfer in electronically stabilized fiber optic link exploiting bidirectional optical amplifiers”, *IEEE Transaction on Instrumentation and Measurement*, vol. 61, no. 9, pp. 2573-2580, 2012.

⁴ P. Krehlik, Ł. Śliwczyński, Ł. Buczek, M. Lipiński, “Multipoint dissemination of RF frequency in fiber optic link with stabilized propagation delay”, paper submitted to *IEEE Trans. UFFC*, 2013.