will produce non-zero values at lags other than zero to indicate a correlation between different lagged observation. Thanks to this feature of the autocorrelation function, drifts of the mean value in the removed noise $\mathbf{v}_s$ as well as its periodicity can be more easily detected from the autocorrelogram than from the original data. As a measure of the random nature of the removed noise, the root mean square value of the correlation function $rms(\mathbf{r}_{vs})$ was used:

$$rms\left(\mathbf{r}_{vs}\right)=\sqrt{\frac{1}{p}\sum_{i=1}^{p}\left|\mathbf{r}_{vs}\left(i\right)\right|^{2}} \qquad (4)$$

The above considerations were checked on simulated spectra consisting of k channels and corrupted with Poisson distributed noise and then smoothed with the Savitsky-Golay procedure using second order polynomial and variable filter width dw [2]. As a measure of the smoothing quality, the ratio of the root mean square error (RMSE) of the total counts for the smoothed and raw spectra $s(N_s)/s(N)$ was applied [3]. The $s^*(N_s)/s(N)$ ratio was computed using bootstrap method [4] for a single spectrum. The both ratios and $rms(\mathbf{r}_{vs})$ *vs.* filter width were plotted and are shown in Fig.1.

It is seen that with increasing filter width, the quality of the smoothing also increases (RMSE ratio is lower), however, beginning from a certain channel, the $rms(\mathbf{r}_{vs})$ also increases sharply indicating that in the removed noise some non-random component appear. If the goal of the optimization is to minimise distortion and maximise smoothing quality, the filter width should be chosen for the $rms(\mathbf{r}_{vs})$ lying on the flat part of the plot and in "safe" distance left from the observed knee of the plot.

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WIRELESS AIR MONITORING NETWORK WITH NEW AMIZ-2004G DUST MONITORS

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Since many years, MIZA and AMIZ dust monitors are used for the measurement of airborne dust concentration. The principle of operation of the monitor is based on determination of dust mass deposited on an air filter from a known volume of air sample. The dust mass is determined from radiation attenuation of a Pm-147 beta source. Additionally, relative humidity, atmospheric pressure and temperature of the air are measured [1].

Usually, the dust monitors are installed in places where wire communication not always is secured. In such a case, direct collection of measuring results is impossible and requires that personnel of the environment protection units has to go frequently to the monitors to collect the measured data. In case the measurements are made in a few different places, such situation restricts the measurements from economical reasons.

To solve the problem, a new version of dust monitor AMIZ-2004G was developed (Fig.1). The monitor, after a general reconstruction, is equipped with a GSM modem enabling communication with a central computer that is also equipped with such a modem. Thanks to the new construction not only a remote wireless communication with AMIZ is possible, but also a monitoring network containing a higher number of dust monitors can be made. The measuring data from all the monitors in the network can now be collected in one central computer equipped with the GSM modem and a proper acquisition program [2,3].

At the beginning of the year 2005, dust monitoring network was put into operation in the Kielce

Fig.1. Airborne dust concentration gauge AMIZ-2004G.

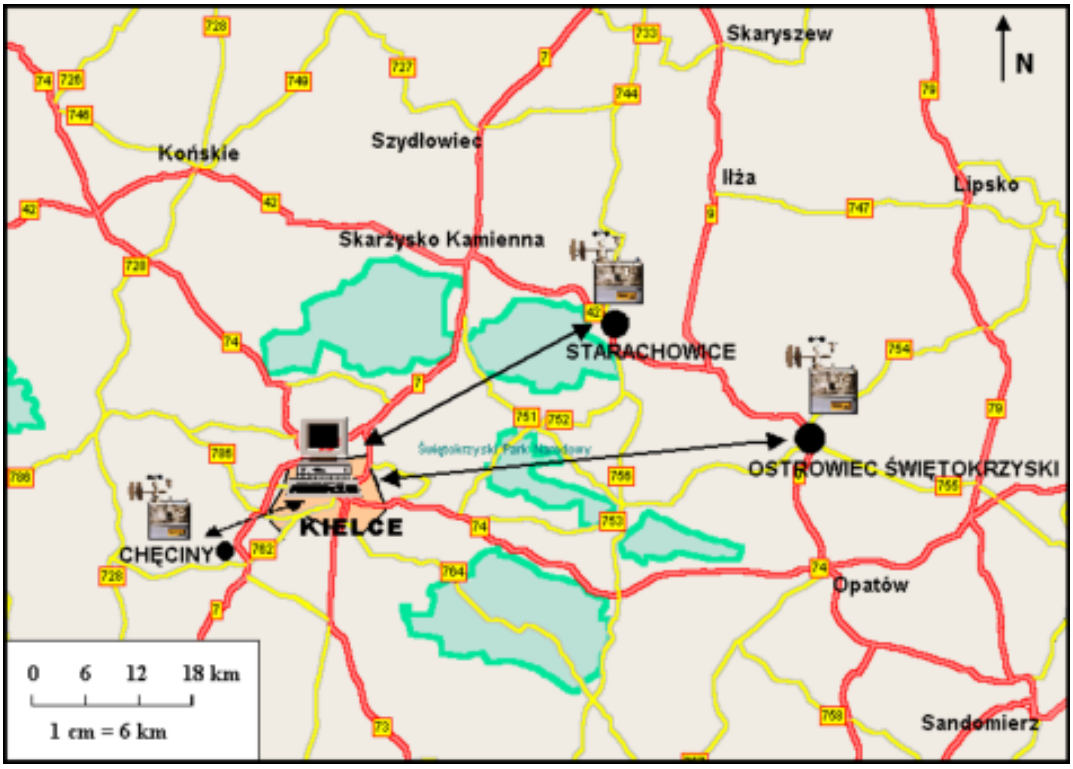

Fig.2. Dust monitoring network in the neighborhood in Kielce.

Voivodeship. Two dust monitors AMIZ-2004G were installed, one at Starachowice the other one at Ostrowiec Świętokrzyski (Fig.2). The measured data from the monitors are collected in a central computer of the Voivodeship Inspectorate of Environment Protection at Kielce. Apart from measured data collection from the AMIZ-2004G monitors, the network offers additionally data collection from two other monitoring stations containing two older AMIZ monitors at Chęciny and Kielce and from monitors of NO_X, NO_2, NO and SO_2 [4].

In the second half of 2005, the Institute of Nuclear Chemistry and Technology received an order for an installation of dust monitoring network in

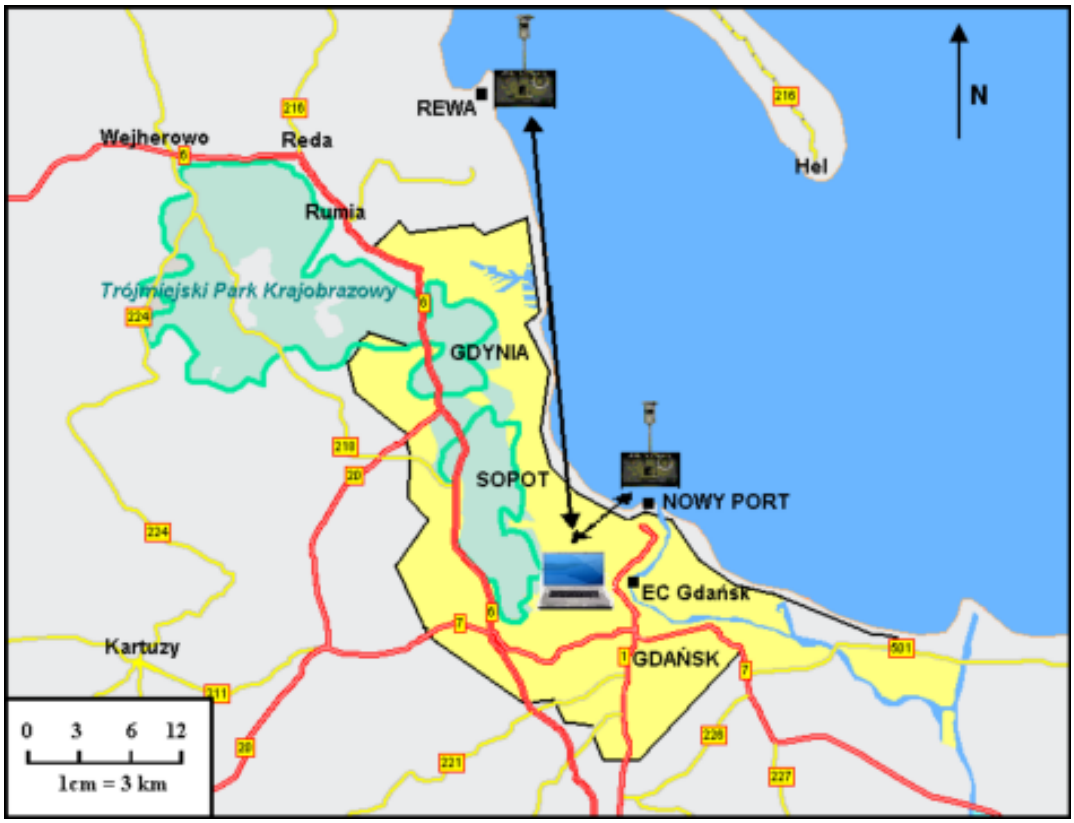

Fig.3. Dust monitoring network in the neighborhood of Gdańsk.

the neighborhood of Gdańsk (Fig.3). The first monitor AMIZ-2004G was installed at Rewa, approximately 60 km from the central computer located in the Environment Management Board of Electro-Power Station Gdańsk. In the coming year, an installation of air dust monitoring is foreseen at New Port in Gdańsk.

The developed and installed software in the monitors AMIZ enables the following functions [5]:

- data acquisition by means of GSM network from AMIZ-2004G monitors,
- data acquisition from a number of monitoring stations,
- readout of data from all the gauges (monitors) located in the monitoring station,
- review of measuring results from different gauges (monitors),
- review of measuring results in external database,
- readout and programming new measuring parameters,
- readout and setting new alarm messages – SMS,
- readout air pump temperature.

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DEVELOPMENT OF INTERNET SERVICE FOR AIRBORNE DUST MONITOR

Adrian Jakowiuk

During use of the system for acquisition and presentation of measuring data from dust monitors AMIZ-2004G [1], it became evident that creation of an internet service should be very useful. The task of such a service would be presentation of the idea of dust monitoring system that was put into operation, as well as presentation of measuring results from already existing measuring stations.

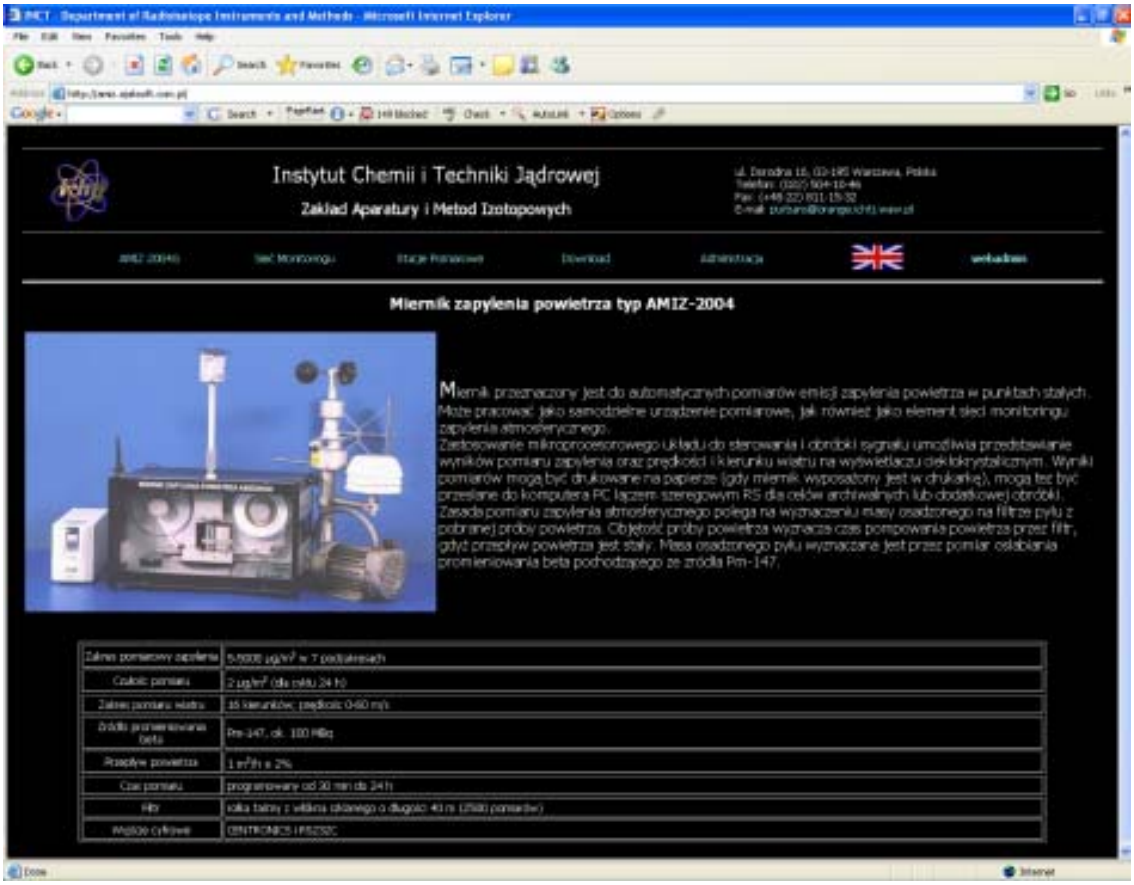

Fig.1. Web page containing information of AMIZ-2004G.