TelSKART©

- A New Method for Measuring Quantity of Tourist Movement (dr. Wieslaw Alejziak)

A very important conference for the tourist industry and the development of tourism research, entitled *Regional Research on Tourist Services Consumers* and organized by Polish Tourism Organization and the Ministry of Sport and Tourism, took place from November 24-25 in Warsaw. For the first time a new and original method of researching tourist movement was presented, one whose aim is to facilitate measuring of the quantity of tourist movement. This method was presented by **Dr. Wiesław Alejziak**, representing the Department of Tourism and Recreation at the Krakow Academy of Physical Education and the Tourism Economics Faculty of the Computer Sciences and Management Academy in Rzeszów. **TelSKART©**, i.e. the **Telephone System for Cellular Analysis of Tourist Movement**, is a method based on using modern technologies, specifically the GSM mobile telephone system.

As many of us know, measuring the quantity of tourist movement is an eternal dilemma in tourism research, and thus far no one has developed an effective method of solving it. Ways of statistically registering tourist movement to date have proven inadequate, as have other methods of measurement, and estimates acquired on their basis can vary by up to several hundred per cent, as many researchers in Poland and abroad have demonstrated. The basic data on tourist movement is supplied by the "hotel method," based on information taken from accommodation sites. This allows us to define the number of people using accommodation sites covered by mandatory guest registration, by consulting the KT-1 forms. Unfortunately, this method gives us no chance to define the total number of people temporarily staying in a given area, as some of them use no accommodations at all, or sleep in places which slip out from under the official statistics (apartments of friends and relatives, "second homes," private rooms etc.). We must also bear in mind that some portion of accommodations fall under the heading of "gray economy." Therefore, data produced on the basis of hotel registrations is quite inexact and sometimes misses a full fifty per cent of the number of tourists staying in a given area. Other methods (e.g. research done in sites offering tourist services, institutions managing tourist attractions, and various sorts of indirect methods, including: passenger transport statistics, tickets to events, national parks, the beach, resort payments, or the "M. Boyer flour method") have also turned out to be ineffective.

A fine example of the problems in measuring the quantity of tourist movement is Zakopane, where the city authorities and sites responsible for tourism development (the Promotional Bureau) confess that "*…in fact, no one knows how many tourists come to the Tatra Mountains during high season. The estimates vary greatly – some calculate that in August there were around half a million people, of whom the majority visited Zakopane, while others reckon that there could only have been around 80,000 tourists in the city itself.*"[1] This view is shared by the Mayor of Zakopane, who – well aware of how important it is for the tourist movement organization to know how many tourists and visitors are in the town and the region – announced (in an interview of September 11th of this year) that in 2010 the town would be counting the number of incoming tourists. He wants to supplement the traditionally applied, though imperfect hotel method with a tourist count, using a few dozen trained volunteers and the model of counting visitors to a national park.[2] For a town this is

[1] Bolechowski P., *Zakopane: policzą turystów*, [in:] "Gazeta Krakowska" of 11.09.2009.
[2] Ibid., and also: http://www.polskatimes.pl/gazetakrakowska/podhale/nowytarg/161246,zakopane-policza-turystow,id,t.html (9.11.2009).

significantly more difficult, however, as tourists go by various routes, and not along marked trails, as they do in the national parks.

In a lecture read on the first day of the above-mentioned conference, Dr. W. Alejziak stated that the idea of using the mobile telephone system to research tourist movement was born after reading a report on the current situation of the telecommunications market in Poland, according to which practically every statistical Pole possesses a mobile phone (over 41 million mobile phone devices are presently registered in Poland).

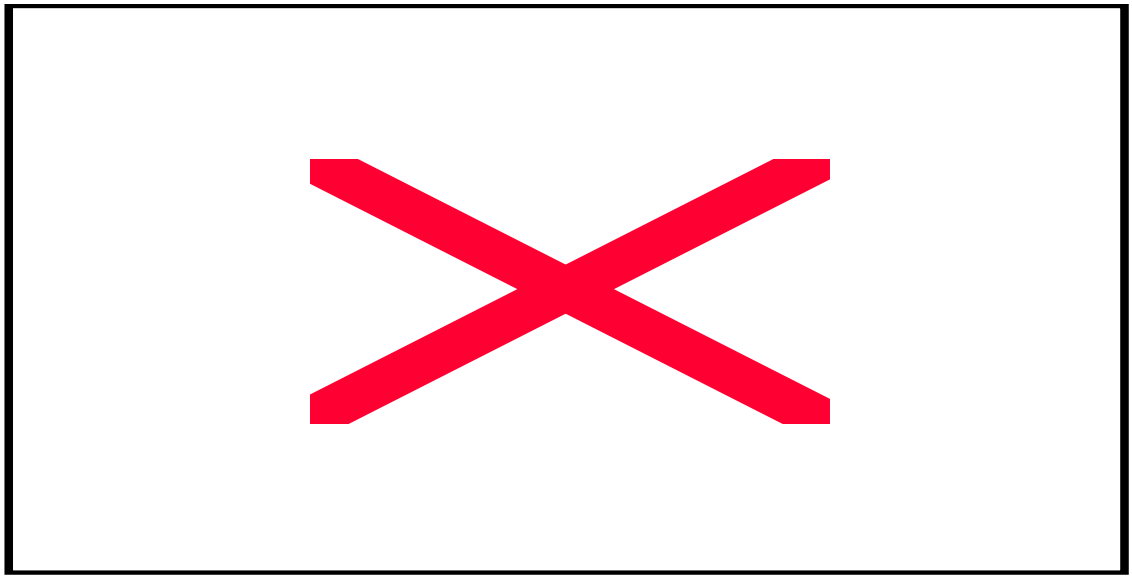
I came up with the idea of developing this method only three weeks ago, while preparing an expert assessment for the Polish Tourism Organization: "Regional Research on Tourist Movement and Tourism Consumer Services in Poland (Present State and Development Possibilities)," says Dr. W. Alejziak. *Having side by side the information that practically every Pole has a mobile phone, and the difficulties encountered in measuring tourist movement, I realized that almost every tourist has such a telephone handy, and the majority of tourists will use it at least once, to share their impressions of the trip, to ask what's happening at home, to arrange some important business etc. And so I started to wonder if there existed the technological possibilities to define the number of calls coming from tourist sites over the course of a day, a month, or a year (it later turned out that it wasn't even necessary to call for an operating device to be registered by the base station). I saw that even if it wasn't possible to discriminate the number of telephones owned by tourists, a simple subtraction of the town's permanent residents from the total number of telephones used in a given period allows us to make a fairly exact – compared to other methods to date – definition of the number of visitors.*

I quickly started a crash course in the principles of how second (GMS) and third (UMTS) generation mobile phones operate, with a particular focus on the technology and functioning side of making and recording calls. Apart from reading the relevant literature, I also consulted experts in the telecommunications field, particularly workers in the State Communications Institute in Warsaw and the Krakow branch of the Era network. These consultations indicated that we have the technological capacity to define the number of mobile telephones working at a chosen time, in a chosen, defined area equipped with base stations (at the moment these cover practically the entire map of Poland).

Having gathered this information, I began to create the basis for a new method of researching tourist movement, which I have named TelSKART©, short for Telephone System for Cellular Analysis of Tourist Movement. The method is based on the analysis of radio signals that are captured from tourists' cellular phones by base stations located in regions of tourist reception. A basic element of the GMS network system, and also a basic unit in analyzing tourist movement in the TelSKART© method, is the cells. I would like to emphasize, however, that in the professional telecommunications terminology – unlike in colloquial speech – this "cell" ***is not the device from which we phone*** *(which carries the name "mobile station") – but* ***the area covered by a single base station****. We might say half in jest, then, that what gentlemen generally carry in their pockets and women in their purses is – in professional terms – not a cellular, but a mobile station.*

Every mobile phone that is switched on keeps in steady contact with the antennae of the base stations whose signals it receives best. If the signal grows weak – while driving a car, for example – the base station controller automatically directs the link to the nearest station (antenna). **The cellular network always knows which antenna our telephone is using, and thus where we are at any given moment.** The whole procedure of making calls is obviously more complicated, and is made up of various elements. The architecture of the GSM system can be illustrated by the ideogram below, in simplified form.

Fig. 1. The Architecture of the GMS System



Source: Kozłowska A. Communications systems, p. 1. (http://www.stud.pwr.wroc.pl/Stare/Systemy_tel/wyklad_2_1.pdf).

According to Dr. W. Alejziak, with the TelSKART© method we will be able to count tourists on the basis of their running mobile stations (or mobile phones), which will be registered by base stations (antennae). Information on how many of those mobile stations (in tourists' pockets, purses and backpacks) were located in a given area at a selected period of time – after processing and inscribing in the relevant registers (HLR and VLR) – can be acquired through Operation and Maintenance Center (OMC) networks.

What are the basic premises and advantages of the TelSKART© method? This method:

- assumes that the quantity of tourist movement (number of tourists) staying at a given time in a freely defined area of tourist reception (particular locales, communities, districts, townships, and even countries, in the case of foreign tourists);
- it allows us to define not just the quantity, but also freely defined spatial structures and seasonal changes in tourist movement, with freely selected periods of analysis time (even down to certain hours);
- can be of major significance for the quality development of tourist movement research, facilitating the optimal selection of research samples for quality analyses (e.g. surveys);

There are doubtless other possible uses of this technology – e.g. researching tourist itinerary routes (streams of tourist movement), based on changing telephone locations, identified by consecutive base stations. It would seem that the method presented here creates very fine conditions for researching various aspects of tourist movement. And yet, its primary advantage is that it will help us to define the amount of tourist movement in localities and regions with a high degree of accuracy.

The method is still undergoing development – says Dr. W. Alejziak. *It has to be fine tuned from a "tourist" perspective, in other words, the needs and capabilities of information gathering have to be established, especially in terms of acquiring information more complex than simply the number of tourists (e.g. dynamics, spatial structure and type of tourist movement, perhaps even the identification of tourist itinerary paths, attractions visited, and*

even more particularly defined behavior of tourist excursions). The technical details also need to be ironed out, creating programs to sort out selected data held by cellular network operators, and above all, to win over the cooperation of these operators. It would seem, however, that the matter is important enough to overcome the problems involved. Some difficulties could be created by the protection of personal data, as pointed out by some commentaries to my conference presentation. But I feel that this is not the most important issue, as for our purposes – the identification of the overall number of tourists staying in a given area – we needn't personalize the data acquired from the operators, as it is only the general count of registered telephone devices that interests us, and not information regarding specific numbers, much less their owners.

In the near future I plan to start testing the method. It seems the best way to make use of this idea – for as I have mentioned, the method is only in its development stage – would be to set up a research grant, whose participants would include not only academic institutions and subjects involved in creating and carrying out tourism policies, but also industry representatives, specifically the most important mobile phone network operators. I soon intend to approach the relevant institutions with a proposal to initiate such a grant. I'm counting on their support in this. I think that the implementation of this method should be of interest to not only local governments and local and regional tourist agencies, but also representatives of various sectors of the tourist industry. Above all, however, it seems that this method ought to interest the most important institutions responsible for the development of tourism in Poland, i.e. the Ministry of Sport and Tourism and the Polish Tourism Organization. This method has one more great advantage: the enormous amount of money it could save. The data we need is already collected in the relevant operator registries. It only needs to be knowledgeably extracted and correctly used. The money conserved through the use of this method could be spent on quality analyses of tourist movement.

In my view, using modern technologies in tourist movement research creates opportunities we might have only dreamed about until recently. The method presented is a good example of this. Its spread and implementation has one more very important aspect. This is the fact that Poland could be a pioneer in this kind of research. My initial analyses of the professional literature (including both traditional academic journals and Internet resources) have shown that, to date, GSM cellular phone systems have probably never been used anywhere in the world to measure the quantity and structure of tourist movement. I have found only a few works that have used GPS (Global Positioning System), part of the equipment of the latest telephone devices (for the time being only a minimal percentage of cellular phones have this). Research has been conducted in which the position of specific tourists was established through the GPS installed in telephones, particularly in crisis situations, such as when a tourist has been lost in the mountains.

To conclude, we ought to add that apart from measuring tourists, this method creates a splendid opportunity to **conduct quality research** on tourist consumption (e.g. through a detailed, very representative method of choosing tests for tourist survey research – it would suffice to invite every tenth or hundredth tourist to take part – according to the laws of high numbers – to acquire quite a representative research sample). It is also worth mentioning that the system of third-generation cellular telephones (UMTS) creates even better conditions for using the TelSKART© method in tourist movement research.

Fig. 2. Ideogram of the UMTS System

Source: Nawrocki P., Mobile systems. Cellular telephones. Work published at:
http://home.icslab.agh.edu.pl/~grex/wyklady/mobilne/SM04-Technologie_sieci_komorkowych_NoRestriction.pdf

***) The following information uses materials made available by Dr. Wiesław Alejziak**
(e-mail: wtalejzw@cyf-kr.edu.pl or walejziak@wsiz.rzeszow.pl)

.