tych teoretycznych błędów w obszarze NMT oraz ich wpływ na błędy ortofotomapy. Teoretyczne błędy będą też porównywane z różnicami między modelami terenu uzyskanymi różnymi metodami.

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CULTURAL LANDSCAPE PROTECTION AND DEVELOPMENT

European cultural landscapes are endangered. Numerous initiatives, supported by the Council of Europe, have been recently undertaken aimed at the implementation of the European Landscape Convention, which has been drawn up to protect not only the most valuable landscapes of our continent but also the landscapes of our everyday life which reflect our contemporary culture. The authors of this work outline a possible approach to cultural landscape protection, which can then form the basis for their active protection.

1 INTRODUCTION

Landscape constitutes the outer image of the surface of the earth in a particular place resulting from the interaction of natural and human factors. Whereas, cultural landscape is a narrower term and can be defined as an area historically shaped by human activity, combining the products of civilisation and natural elements.

This work discusses chosen issues related to cultural landscape protection and development. Practical examples drawn from countries which are more advanced in that respect reveal that protecting and developing such landscapes should be an active process. Moreover, modern methods of cultural landscape protection and development require a comprehensive approach. Preparatory activities are very important here, as they should mainly help to characterize general natural and cultural values of the landscape and describe the elements which constitute its identity.

The authors present chosen methodological approaches to comprehensive cultural landscape protection and development.

2 STUDYING A LANDSCAPE UNIT

In order to set up a comprehensive programme of cultural landscape protection and development it is necessary to determine first to what landscape unit (LU) it belongs. The starting point will be then a

so-called study of a landscape unit. In Europe, landscape units are relatively small and tend to be between a hundred and several hundred kilometres in size. Generally speaking it is an area (landscape) which significantly differs in character from other such units. Each landscape unit is an overlay of natural and human factors. Buildings, trees, and the vegetation may be the most obvious elements in a landscape; but underlying these are the soil, the rocks, and the form of the land. In turn, overlaid on the buildings and the land cover are the light and colour of the scene, and the overall feeling that the landscape brings. Additionally, there are associative aspects, brought about by the history of the place, monuments and other elements – peculiar for the particular landscape unit. All these layers contribute to the character of the landscape. The character can be assessed by means of a simple matrix, within which we study 10 landscape 'layers' (Spiegler and Dower, 2006).

1. rocks (*surface geology*);
2. climate (*hydrology, rivers, lakes, glaciers*);
3. land form (*geomorphology*);
4. soil;
5. land cover (*vegetation, fauna, habitats*);
6. characteristic features and patterns of agriculture and forestry;
7. characteristic forms of houses and settlements;
8. other man-made features (*e.g. industry, tourism, infrastructure*);
9. historic features and
10. feelings and associations, the spirit and feelings brought about by the landscape, emotional aspects (*e.g. a former battlefield, a place of residence of famous people*).

Studying a landscape unit should begin with an analysis of maps, which will make it possible to 'see the whole of it.' To choose an appropriate map, it is necessary to have some idea in advance what landscape unit we want to describe – even if we do not know undoubtedly where its edges are. A physical map can be the means by which we provisionally identify them. It is also important to study some literature and publications about the area under research.

The main part of work, with the Ecovast method, is done in the field and should be carried out by a group of about 10 people (Spiegler and Dower, 2006). It is best to start the field work with finding viewpoints, from which broad views over the landscape can be gained. Then, the group should travel through the landscape gaining further impressions. On the way, each person keeps record of their observations concerning each of the 10 landscape 'layers.'

The aim of the fieldwork is, by and large, to gain general impressions of the landscape unit and also to define where the edges between adjoining landscape units are. It is indispensable to photograph those views and characteristic features which are most striking.

The last step is the writing up. It should be best done by the whole group after they have watched the photographs and when they are recollecting the experience of seeing the landscape with the help of their field notes. Only at this stage should the landscape matrix be completed. The results written up in the matrix should constitute a resultant of all participants' field notes. Particular features are given a weight by determining whether they are 'dominating', 'strong', 'moderate' or 'low' in their contribution to the character of the landscape unit.

The table below presents general results of a pilot study concerning landscape identification with the Ecovast method in Poland, carried out in April 2007, at the Municipality of Wiśniowa – Myślenice County, Małopolska Voivodeship.

Table 1. Landscape identification for the village of Wiśniowa, the Ecovast method

	Relative strength of the features			
	dominating	strong	moderate	low
10[1]		**C** Prevailing quietness, associative feelings		
9				**F** Religious and historical structures
8				**G** Power lines disrupting the landscape
7	**A** Low-density housing, a farm in its historical form			
6			**E** Agricultural production area typical for the foothills	
5	**B** Land cover characteristic for the municipality			
4				
3		**D** Characteristic land form with a valley		
2				
1				

source: own study

Figure 1: Matrix for landscape 'layer' assessment produced in Wiśniowa

The photos presented below illustrate the elements of the landscape unit of Wiśniowa enumerated above:

[1] Numbers form 1 to ten refer to landscape 'layers' mentioned above in this publication.

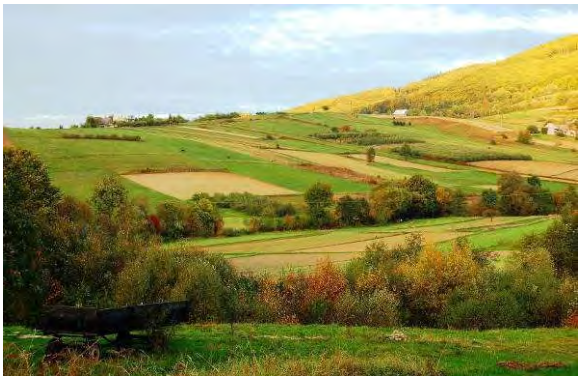
A: Low-density housing, a farm in its historical form

B: Land cover characteristic for the municipality

C: Prevailing quietness, associative feelings

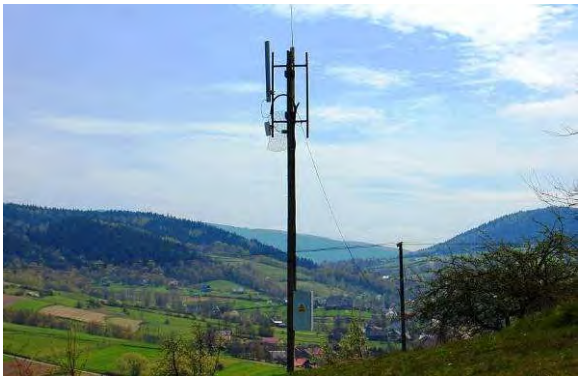
D: Characteristic land form with a valley

E: Agricultural production area typical for the foothills



F: Religious and historical structures

G: Power lines disrupting the landscape



3 AGGREGATION, MAPPING AND A DESCRIPTION OF PARTICULAR COMPLEXES OF A LANDSCAPE UNIT

After a landscape unit has been described it is often important to study its resources in more detail and mark them on the map. A so-called 'landscape mapping key' can be used for landscape unit aggregation. It differentiates between (Schmid, 2004):

- landscape unit complexes, that is functionally correlating units of landscape elements, which have developed similarly throughout history;
- landscape unit elements, that is well-definable spot-, line- or area-segments of the landscape unit, and
- landscape unit element parts.

'Landscape mapping key' constitutes a unique guarantee that this basic structure of the landscape unit (*complexes, elements, element parts*) will be preserved and protected while realising planning tools or creating schemes for landscape protection and development or other projects which can exert some influence on the landscape. 'Landscape mapping key' is based on functional relationships of landscape unit elements with people who inhabit the area. The principle of using 'landscape mapping key' lies on the assumption that complexes and/or landscape unit elements have 16 basic functions for its contemporary inhabitants (Schmid, 2004):

1. residential (*settlement*),
2. transport (*communication routes*),
3. representative (*objects linked with political power or rule*),
4. religious (*object of religious cult and rites*),
5. recreational (*tourist, recreational, leisure complexes*),
6. communicational and informational (*telecommunication infrastructure*),
7. defence (*military objects*),
8. disposal (*waste collection structures, flood water collection structures, etc.*),
9. trade (*objects linked with trade and supply*),
10. energy generating (*devices for energy production and transmission*),
11. industrial production (*buildings used by industry and craft*),
12. agricultural (*food production*),
13. forestry (*forests*),
14. nature / ecological,
15. water supply (*water intakes*) and
16. mining (*extracting natural resources*).

Landscape aggregation and mapping is divided, similarly to the Ecovast method, into three stages:

- individual preparatory activities;
- fieldwork, during which particular elements or their parts are described in special forms, and
- individual work over a register map of complexes and landscape unit elements together with the descriptive part

4 CONCLUSION

Studying and characterising a landscape unit as well as the aggregation and mapping of its particular complexes and elements serve as a tool for determining the character of the landscape unit. These studies should constitute a basis for the strategy of active protection and development of cultural landscapes. It is best if they become a source for a concrete project drawn up with the aim of preserving the character of the landscape and those elements, which decide about the uniqueness of the place.

It is a general rule that before commencing research on cultural landscape it is necessary to determine the object of this research as well as the aim the results will serve. The narrower the topic of the research is, the more specific, better described and documented its effect will be. Conducting research

with a specific goal in mind makes it possible to minimize analytical work, 'preventing oneself' from the necessity of collecting extensive initial data.

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ОСНОВНІ ПРИНЦИПИ УТВОРЕННЯ ТА МОДЕЛЮВАННЯ ОБ'ЄКТІВ У НАЗЕМНОМУ ЛАЗЕРНОМУ СКАНУВАННІ

The main principles of method of terrestrial laser scanning of objects creation of point - clouds by laser scanner, obtaining of graphical imagering, visualization and object modeling are described in the paper.

В статье приведены основные принципы метода наземного лазерного сканирования объектов - построения облака точек лазерным сканером, образование графического изображения, визуализации и моделирования объектов.

Постановка проблеми. У теорії та практиці фотограмметричної науки наприкінці 1990-х років відбулись прогресивні зміни, новий поштовх, зумовлений розробкою та впровадженням лазерних технологій. Хоча метод цифрового фотограмметричного знімання залишається актуальним, а цифрові технології успішно застосовуються й удосконалюються, все ж метод лазерного сканування та моделювання об'єктів щоразу більше завойовує простір світової науки та практики. Фотограмметричні лазерні сканери застосовують тепер як бортові прилади в аерофотозніманні, так і стаціонарно в наземному зніманні. Зокрема, у наземній фотограмметрії лазерне сканування дозволяє строго визначати координати безлічі вимірюваних точок та положення об'єкта, точне відтворення та моделювання його поверхні.

Метод наземного лазерного сканування об'єктів, завдяки високій точності та дистанційності, представляє особливий інтерес для фахівців таких галузей як будівництво та архітектура, реставрація та документація споруд, геологія, археологія, спалеологія та ін.

Дослідження та публікації останніх років. Тема лазерного сканування об'єктів продиктована часом та особливо популярна в останні роки; вона висвітлюється на сторінках науково-технічної літератури, у матеріалах міжнародних наукових конференцій. Зокрема, основну концепцію і теорію методу лазерного сканування з точки зору фотограмметричної науки запропонували та розробляли такі вчені як Н.Пфайфер, К.Краус, Люман Т, Р.Шварц, А.Ульріх та ін. Практичною реалізацією методу на прикладі численних експериментів займались С.Брізе,