CCES – „Competence Centre for Engineering Surveying“ – A Knowledge Basis for the Surveying Engineering Profession

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SUMMARY

The internet service *Competence Centre for Engineering Surveying* (CCES) is a platform for a knowledge-based management system for the surveying engineering profession. CCES presents an overview of the numerous areas of activities in engineering surveying. In addition to application possibilities and guidelines, this internet service offers a collection of working groups associated with engineering surveying. It addresses mainly people from outside the profession to give them an idea of what the engineering surveying profession can offer in specific areas.

One of the main aims of knowledge management is to establish an appropriate framework to support the optimal development and application of knowledge. CCES could be such a framework in engineering surveying. CCES is a basic model of knowledge management in engineering surveying with action, knowledge and data levels. This paper explains the motivation for such an information exchange model, the basics of the conception phase and some achievements so far.

ZUSAMMENFASSUNG

Die Internetseite *Kompetenzcenter Ingenieurvermessung* (CCES) kann als Plattform für den Wissenstransfer in der Ingenieurvermessung gesehen werden. Das CCES gibt einen Überblick über die zahlreichen Aufgabenbereiche der Ingenieurvermessung. Zusätzlich werden Anwendungsfelder und Richtlinien sowie eine Liste von Gremien, die die Ingenieurvermessung tangieren aufgezeigt. Es soll hauptsächlich Leute aus den Nachbardisziplinen ansprechen, um zu vermitteln, was die Ingenieurvermessung in bestimmten Bereichen leisten kann.

Eines der Hauptziele des Wissensmanagements ist, einen entsprechenden Rahmen einzuführen, um die optimale Entwicklung und Anwendung des Wissens zu fördern. Das CCES könnte solch ein entsprechender Rahmen in der Ingenieurvermessung sein. Das CCES ist Teil eines Grundmodells des Wissensmanagements in der Ingenieurvermessung mit Aktionsebene, Wissensebene und Datenebene. Dieser Beitrag beschreibt die Motivation für solch eine Informationsbörse, die Grundlagen der Einführungsphase und einige Leistungen.

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1. MOTIVATION AND OBJECTIVES

The objective of the competence centre is the promotion of surveying engineering for technical projects. It seems to be important to make public the potential of this profession for different problems in construction and industry. Nowadays there seems to be no better way to promote this than by a presentation in the internet.

Surveying tasks exist during the definition phase of a project, the planning stage, the construction period and the long time of utilization, e.g. by adequate monitoring. The idea of CCES is to give easy available and easy understandable information to decision-makers and technicians, who may have surveying related, i.e. geometrical, problems and therefore may be interested in surveying engineering solutions. In contrast to most other publications here the participation of the surveying profession and the recommended techniques are ordered thematically, which allows a potential user to find directly the information, he requires for his specific problem (Niemeier 2002).

2. CONCEPT

Up to now the CCES is an activity of the working group “Engineering Geodesy” within the German Society for Surveying and Geoinformation (DVW). This working group exists since decades, processing and supporting actual instrumental and methodological developments in this area of our profession (Fig. 1).

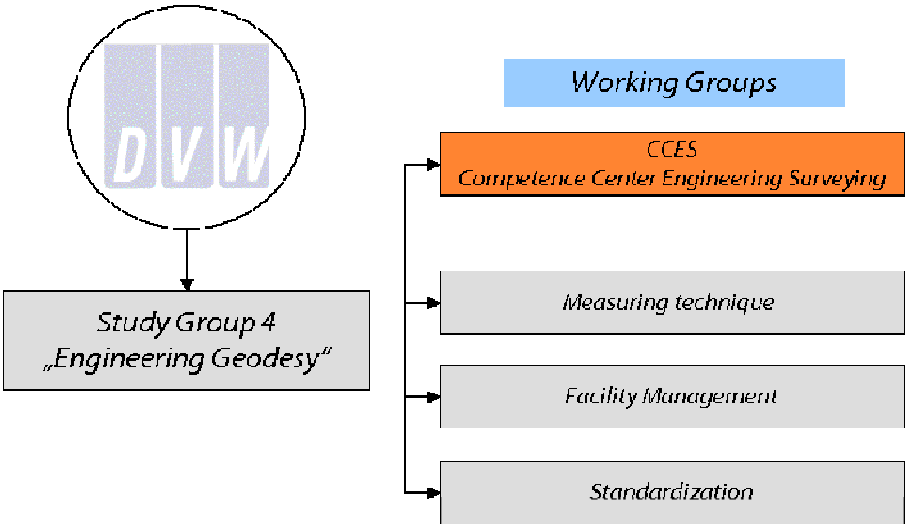

Figure 1: Working group CCES within German Society for Surveying and Geoinformation

It is intended to open CCES to further working groups, who want to support the establishment and maintenance of this web-presentation.

2.1 Structure of the CCES

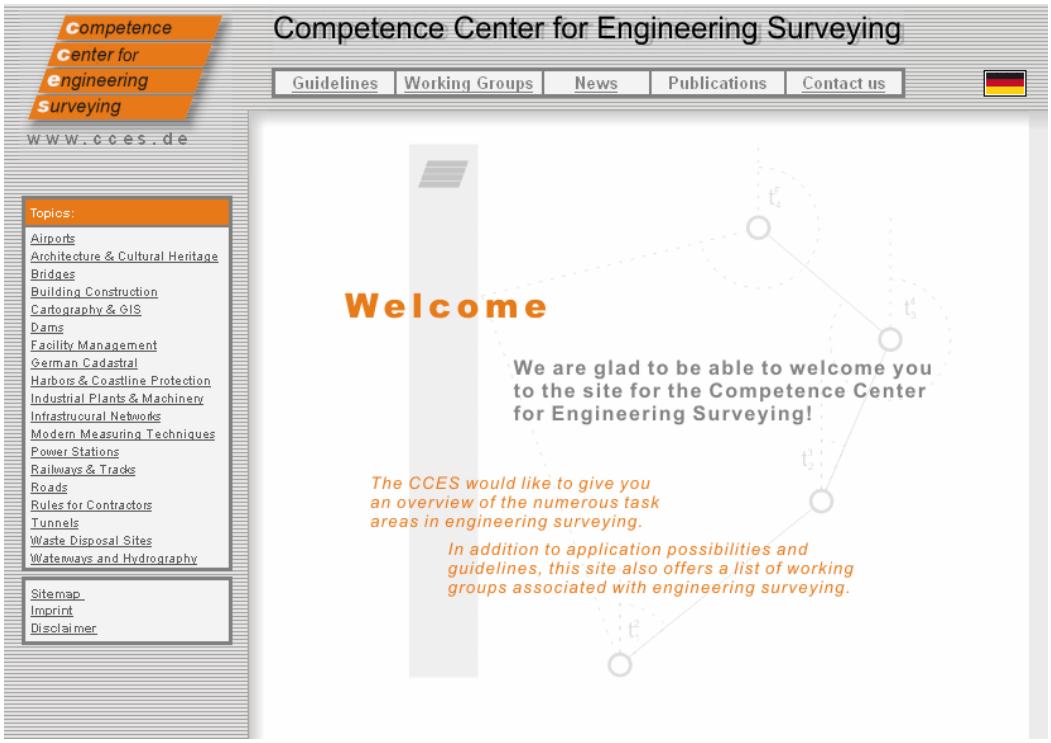

Figure 2: Front page of CCES with main structure of information

The basic structure of CCES can be seen in the copy of the homepage of the CCES-web-presentation in Figure 2. The topics, to which relevant information will be provided, are listed in Table 1. These topics are related to direct applications and are intended to serve as keywords for neighbouring disciplines to get contact to and interest in CCES.

General aspects	***Large constructions***	***Complete class of constructions, general tasks or projects***
Register of Land	Airports / Bridges	Architecture and Cultural Heritage
Cartography and Geo-Information-Systems (GIS)	Dams / Harbours	Facility Management (FM)
Modern Measuring Techniques	Power Stations	Industrial Plants and Machinery
Rules for Contractors	Railways / Streets	Infrastructure Networks
	Tunnels	Protection of Costal Lines / Waterways and Hydrography
	Waste Disposals	Structural Engineering (high-rise building)

Table 1: Preliminary list of topics ordered into 3 subsets

An example of one detailed topic with its general structure is given into the following figure.

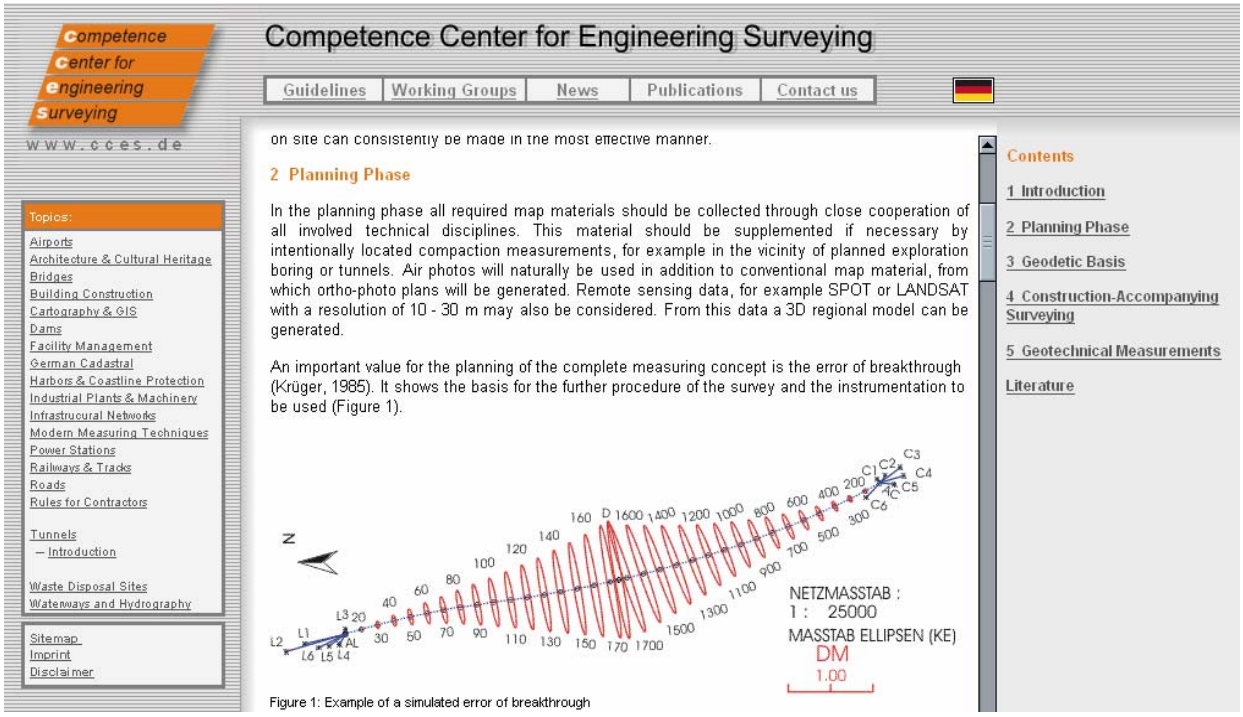

Figure 3: CCES-topic : Tunnels

The presentation of information for each of the above mentioned thematic topics follows the progress of work and is not structured like in textbooks, where the complete knowledge is composed of logical functional chapters. To explain, where the difference lies, in the following the content of CCES is described for the example of a bridge. If someone clicks on "bridges", he will get the information where and how the surveying profession can participate during the different phases of the life of a bridge :

- *Conception of a bridge*: Topographic maps or digital data (GIS) to get general pre-information on the area of interest, including flood data, tenders of land and political boundaries. Links are proposed to information on traffic streams, geological maps and other related data.
- *Planning stage*: How to get the relevant geometry of the area in scales 1:5000 to 1:500 and how to use this information. Importance of a control network including the official coordinate system. Requirement for typical bridge constructions in terms of precision and reliability. Possible solutions by most modern instruments and adequate data processing. Examples.
- *Construction phase*: How to maintain the existing or newly set-up control network. Optimum techniques of setting-out for different sections of the construction. Requirements for the strength of the geometry and how to fulfil them. Examples.

- *Monitoring:* What to monitor to guarantee the safety and to maintain the usability of the bridge for a time span as long as possible. Which techniques are at the moment available to realize this monitoring. Examples.

3. CCES KNOWLEDGE BASIS

In principle, we can differentiate between implicit and explicit knowledge (Pol 1958). Under implicit knowledge one can understand the "know-how" of a person which has been acquired through experience and learning. Explicit knowledge can be seen as the opposite of implicit knowledge, as knowledge presented in the form of documentation or language. In principle, one can use a hierarchical knowledge model here. Knowledge arises from data in combination with information (Fig. 4). For the knowledge input in CCES it is necessary to find an acceptable way to transfer the implicit knowledge, may be from the members of the CCES working group, into explicit knowledge. A solution could be the introduction of a content management system, see sec 3.1.

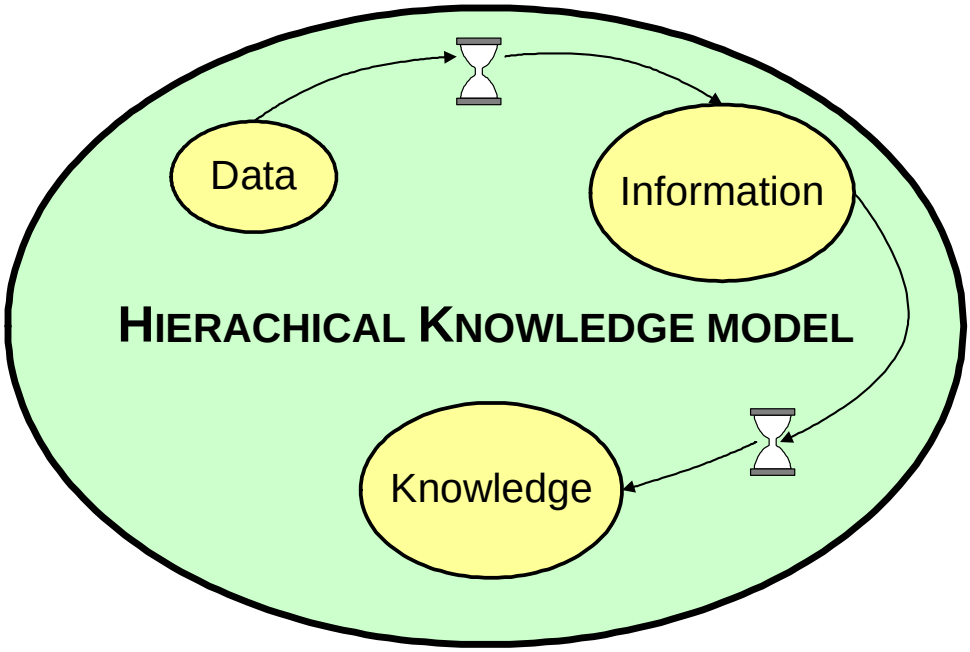

Figure 4: A Hierachical Knowledge Model

For the CCES the knowledge management can be regarded as a process. For the simplification of this process, one can differentiate between two fundamental levels and a third level for the technical realization. The knowledge level and the data level provide input for the action level (Fig. 5).

The CCES web-sites constitute the data level, filled with information form the knowledge level, may be the members of the study group 4, see Fig. 1, and the result is the action level, the user. The process gets movement by information exchange between the user and the

CCES. The user receives basic knowledge about engineering surveying profession from the CCES web-sites and the CCES profits from the user's feedback.

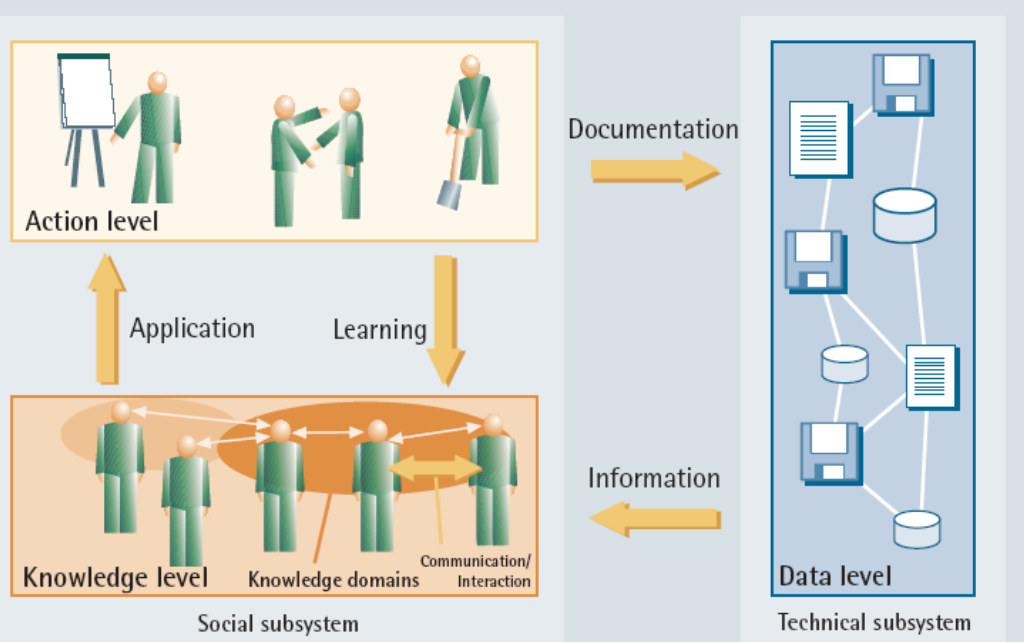

Figure 5: Basic model of knowledge management (Bornemann 2003)

3.1 Reasons for the Introduction of a Content Management System for the CCES

At the moment, we have a static system with editorial contents and layout in a file as well as a central administration and processing of the contents (Fig. 6).

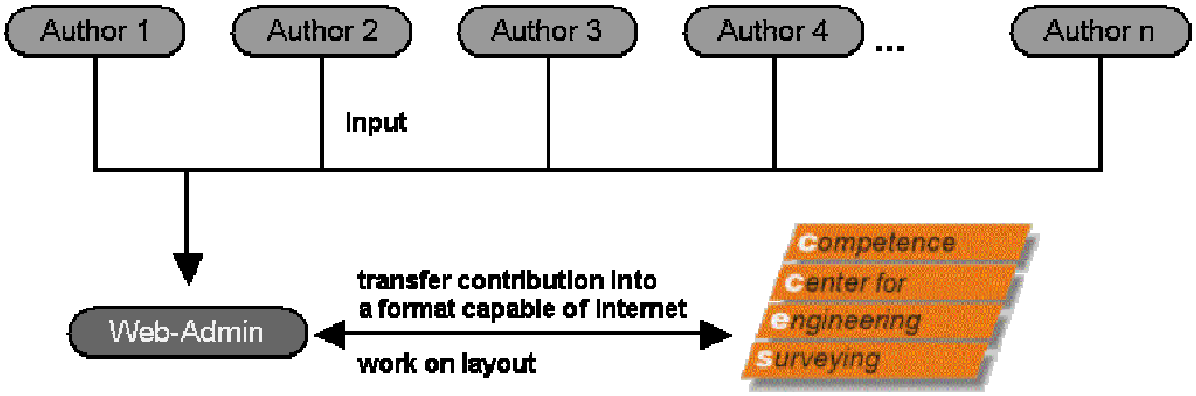

Figure 6: Actual situation of the CCES

The disadvantages are an expensive data take-over by the web administrator. The actual system isn't scaleable on larger user and author numbers and an integration of additional services is difficult. The target is a strict separation from layout and contents with a fill-in of

the contents in the layout presentation by the author, this offers the advantage of a more spatially distributed processing.

3.2 Construction of a Content Management System for the CCES

For a better way of knowledge input the insertion of a content management system (cms) was decided by the CCES working group. In a cms user groups with different access and processing rights can be laid out. The authors user names and login passwords get to the content management system and their contributions can work on directly in the cms editor (Fig. 7). Of course by the different access codes the contributions are protected and can't be changed by other authors without express consent.

By the change the potential for a further increase of the user numbers is made use of since, till now, filled topics aren't processed with contents yet and the supply can regularly be updated and enlarged in the other areas.

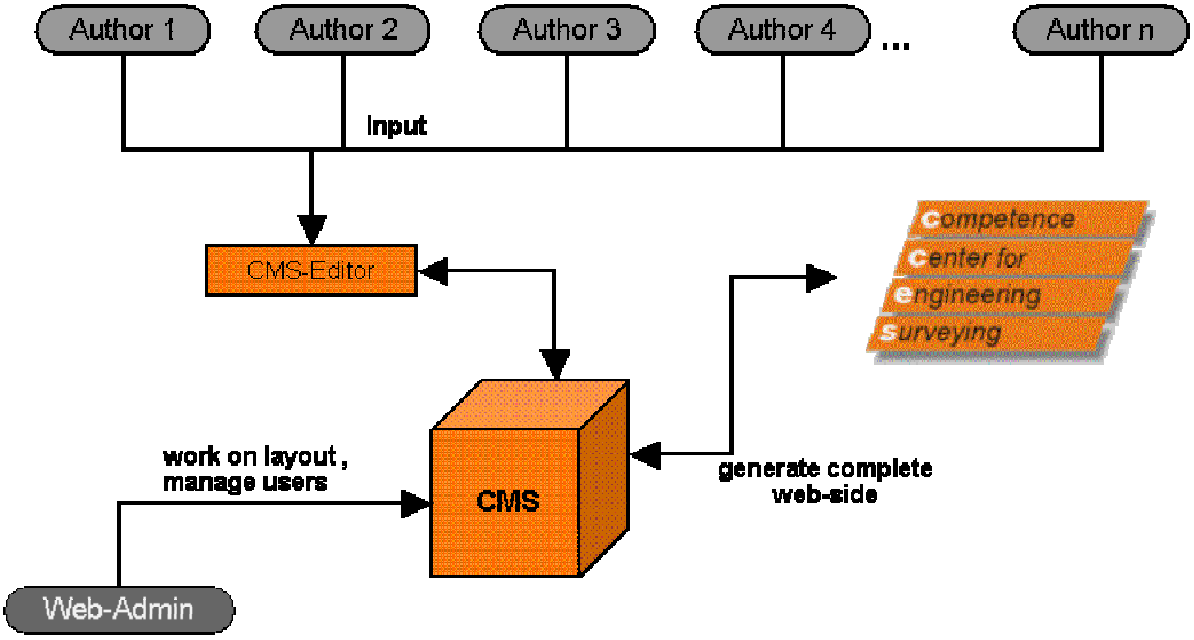

Figure 7: New structure for the CCES by the use of a cms

4. VIEW

CCES has to and will be presented to neighbouring disciplines by special publications and presentations in the near future. It turned out very soon, that the development of the complete system CCES is a big challenge, which can only be achieved in acceptable time, if further groups will support our work substantially. By the use of the content management system we hope to increase the acceptance of the CCES and increase the readiness for participation.

Remarks to the contents or questions to further information for a specific topic can be addressed to redaktion@cces.de, while technical questions regarding the handling of and access to the information should be mailed to webmaster@cces.de.

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BIOGRAPHICAL NOTES

Markus Schäfer received his Dipl.-Ing. in Geodesy from the University Hannover in 1997. He is currently employed as research associate at the Institute for Geodesy and Photogrammetry of the Technical University Braunschweig where he work in the field of engineering surveying projects in the field of tunneling and geometrical project management.

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