

# WWW SYSTEM FOR MODULAR COURSES ON MODERN SENSORS

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*Abstract: An international educational project "Sensor" has been approved by the European Commission in the framework of Leonardo da Vinci programme. During the next three years, international partners from 8 countries will create educational materials of several expertise levels from university to apprenticeships and requalification of unemployed. An integral part of this project is the WWW-information system and sensor information database supposed to serve for distance-learning purposes.*

*Keywords: WWW, distance learning, sensors*

## 1 THE PROJECT

The "Modular Courses on Modern Sensors" is an educational project aimed at initial and continued vocational training of professionals dealing with sensors.

The target groups of the product are:

- in-company training of employees (including SMEs, which do not have resources for their own vocational training),
- school courses from technical colleges to universities,
- distance learning, including virtual laboratory to enable interactive experiments for distance education

The core part of the project is a set of master modules (in English) created by experts in the field of sensor technology from various European countries and reviewed by other members of the international project team. These modules should be university-level (but practically oriented) textbooks covering the industry-accepted solutions as well as the recent advances in the field.

The planned topics of master modules are:

- Pressure sensors
- Optical sensors
- Flowmeters
- Sensor buses & intelligent sensors
- Accelerometers and inclinometers
- Chemical sensors and biosensors
- Level and distance sensors
- Temperature sensors
- Solid-state gyroscopes and navigation
- Magnetic sensors
- New technologies and materials

Other modules will be derived from these master modules. Individual project members, according to the needs in their countries, will create educational modules in national languages. These modules will range from university-level to initial and continuing vocational training to distance learning and – where required – also designer-level modules diving into more details.

Unlike classical textbooks, the courses will be customised for target groups, practically oriented, updated and flexible and they will contain laboratory exercises and hands-on experiments of classical or virtual (distance-learning) type. The beta-versions of the educational modules will be tested by project partners and their subcontractors. Final versions will be announced on web-sites, at industrial journals, scientific conferences, etc.

Finally, multi-language web-based (plus multi-medial CD-ROM) structured information source will be available. Moreover, authors of master modules and their counterparts in individual national

member organisations will create multi-language glossary of technical terms. The design of on-line courses should follow the conclusions and the experience from known research [1,2].

## 2 THE WWW INFORMATION SYSTEM

The web information system currently being developed will provide on-line version of the courses together with additional information. For example, terms from the glossary are displayed as hyperlinks in the text and the user can easily access their respective explanations – see Fig. 1.

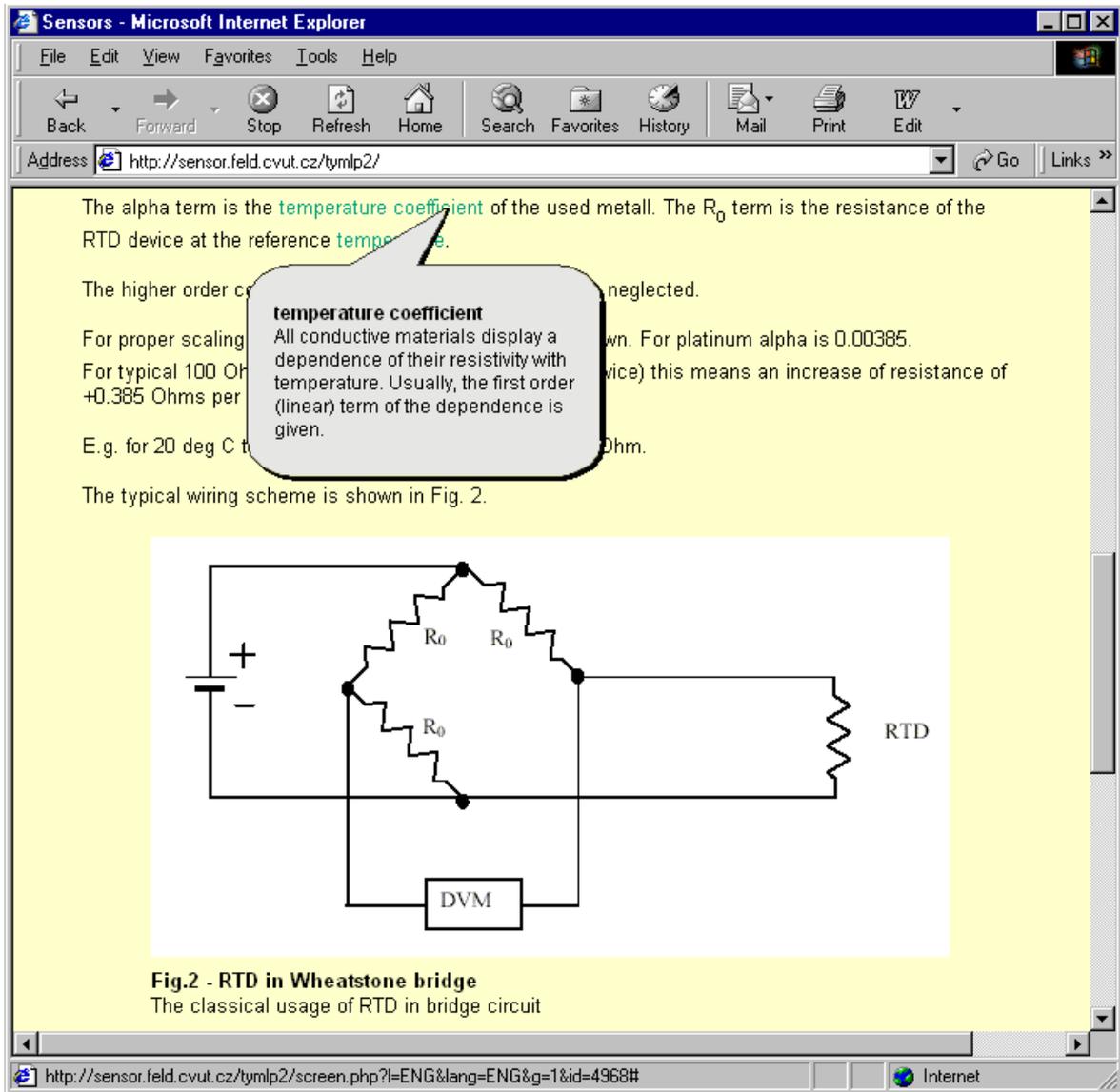


Fig. 1. Screenshot from the material about temperature sensors

Beside that, the glossary terms will also be translated into other languages to form a multi-lingual technical dictionary. Eventual links to additional graphics, active contents like the java applets or external links (to manufacturer's websites) are also included.

The java applets can be used to present virtual laboratory where students can experiment with interactive models of real sensors based on their mathematical description.

The final version of the system will allow filtering of advanced topics in the presented texts by selection of user level. In this way, beginners will not be overloaded with excessive details, while advanced users can still have access to them.

Beside the text and graphics of the online courses, the server shall also include a simple database of typical (commercially available) sensors. The sensor database – provided for educational purposes as a representative example of today's sensor technology – shall allow searching for a suitable sensor. Parameters like range, accuracy and working temperature can be used for search.

The picture bellow gives an example of the user interface of the sensor database – see Fig. 2.

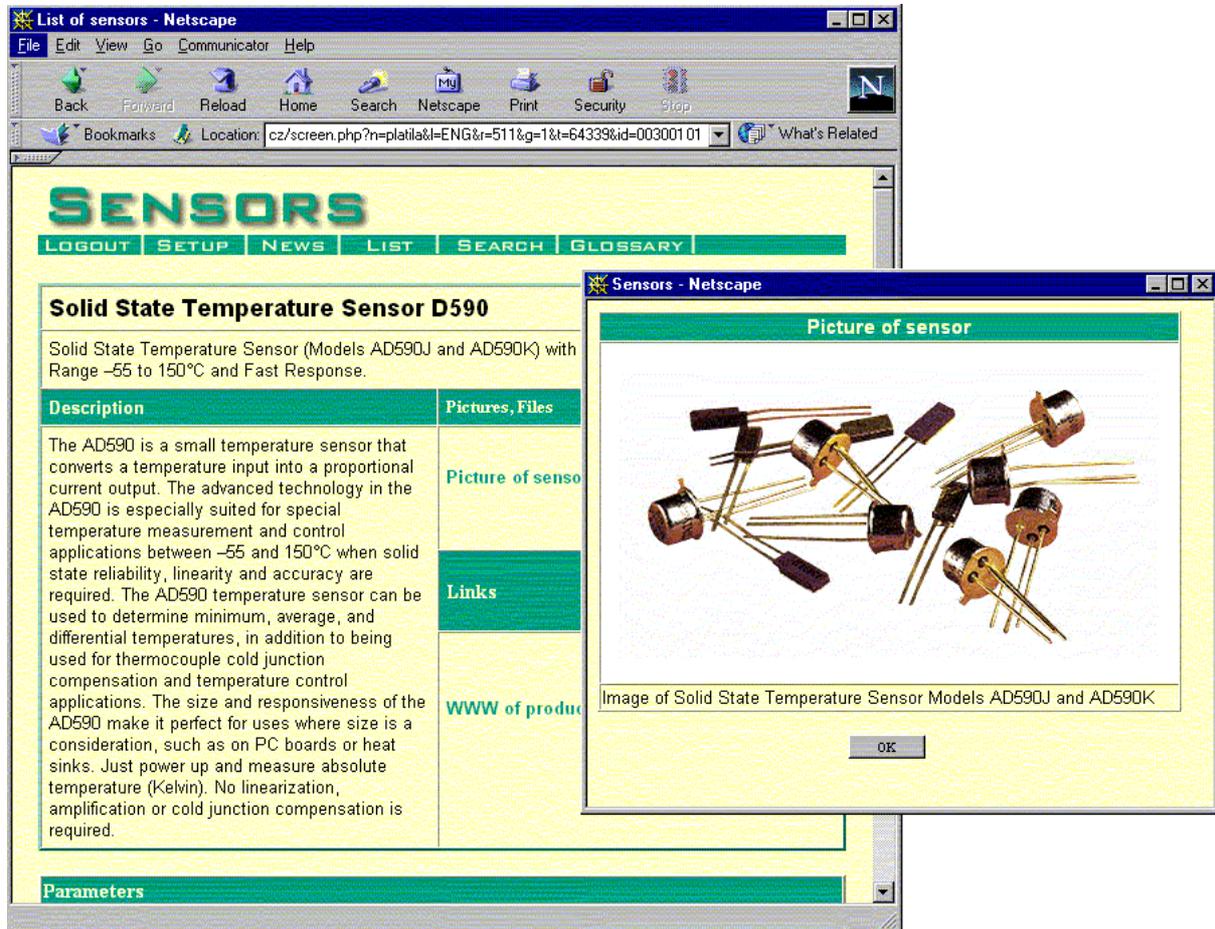


Fig. 2. Screenshot from the Sensors database

The administrative interface (Fig. 3) allows editing of the educational materials and simplifies management of various language versions.

The author can easily insert various objects like text, hyperlinks, files and figures. It is also possible to position the document in the hierarchical structure of documents. It can be seen that the default language version is English. The system helps the author to create different language version and to keep the individual versions consistent.

The author of specific document can edit or delete any material only after successful login. He / she is also allowed to edit only those materials created by him / her.

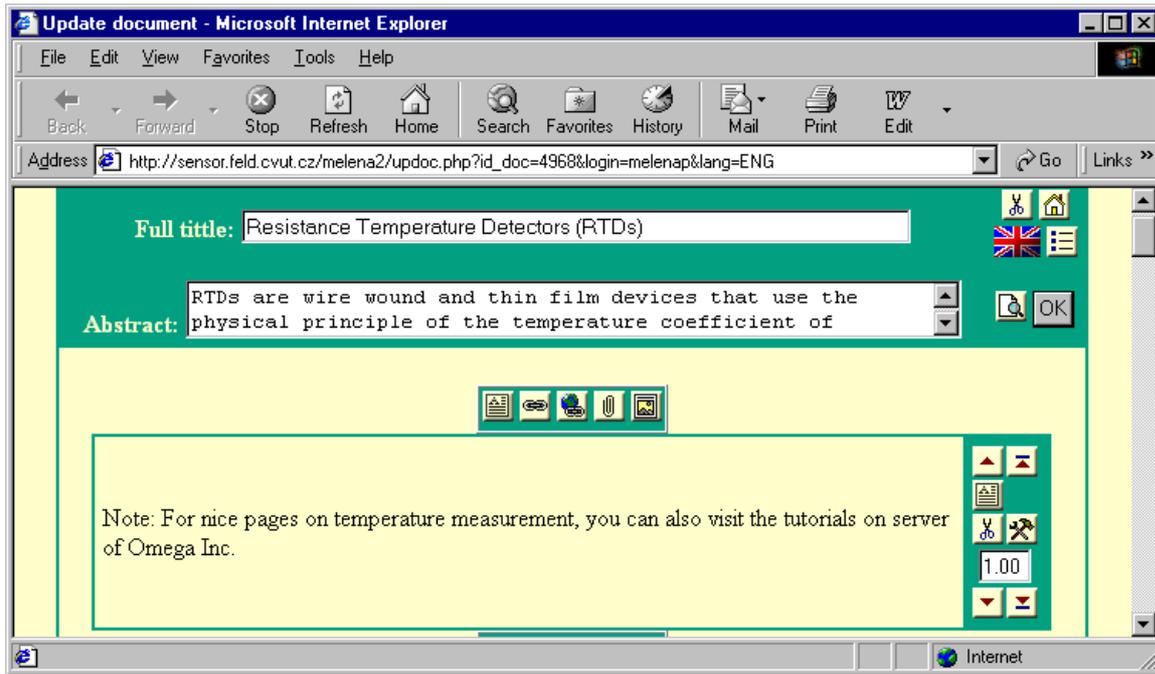


Fig. 3. The editing interface

Current developmental version [3] contains only a fraction of the final information and serves only for early internal evaluation. The 'real' content will be inserted into the database during the project lifetime (the project ends in fall 2003).

### 3 THE TECHNOLOGY USED

The system uses dynamically created pages, which are built using Apache web server plus PHP scripting language and MySQL database technologies. Additionally, JavaScript is used to improve interactivity in some cases. This approach allows to easily present varying content depending on the choice of target language and user level (university / professional / basic). All the above mentioned technologies are open (non-proprietary) and use client-neutral, well-defined standards. Apache, PHP and MySQL are freely available systems that can be downloaded from Internet. JavaScript is supported in both most popular MSIE and Netscape Navigator web-browsers.

### REFERENCES

- [1] J. M. Wilson, Distance Learning for Continuous Education, *Educom Review* **32** (2) (1997)
- [2] N. Hara, R. Kling, *Students' Distress with a Web-based Distance Education Course*, CSI Working Paper No. 00-01, CSI Indiana University, 2000
- [3] <http://sensor.feld.cvut.cz> – in construction

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