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„GIS of Tomorrow & The Future of European Spatial Data Infrastructures“

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When speaking on the future of *Geo-Information Systems (GIS)* and *European Spatial Data Infrastructures (Euro.SDI)* as components becoming an important geo-referencing part of the Information Society I would like to introduce myself as a scientific *cartographer* which has been graduated end of the 60ies from Technical University Dresden (Saxony/Germany), post-graduated in the 70ies with research on automatic generalization in cartography, working as an university teacher until the end of the 80ies in order to educate and train a whole generation of students, and also aspirants, for the mapping branche, and which also got experienced in the 90ies with the private industry and consultancy in the field of *cartomatics* and *geo-telematics*. Since these three decades we have seen enormous technological development introduced into spatial mapping by *electronics, informatics and telematics*. Within that context and background I was involved in, and contributed to automap technology, I always paid attention to new information and communication techniques available to give cartographers access to modern *cognitive tools*. During these evolution periods of technology very often the future of „*paper maps*“ had been predicted (mainly by *informaticians*) as to be restricted to *communication* functions only, which could or even will disappear, when digital datasets/databases can be handled more easily by visualization tools used in GIS for graphic output displays and on other geomedia devices.

But, nevertheless, scientific approaches well-known by *systemic cartography* since the 70ies show, that, nowadays, within the era of informatics and telematics, the use of *Internet, Extranets and/or Intranets* as the „*communication*“ medias can generate new solutions for *sectoral, complex and systemic digital mapping of knowledge* using *GI and GIS* to model, analyse, simulate, distribute and visualize spatially problems to be solved and to support decision making by new types of „*intelligent maps*“ to be used interactively as *cognitive tools*. Such a *cognitive* approach allows to generate new datasets needed, to derive new information from distributed spatial databases, to update spatial knowledge from *interoperable* networked information systems, and to communicate the *knowledge* needed for instantly decision making in a spatially informed „*knowledge society*“ of the future, mostly in an online mode, and by a mobile services environment used.

I am intentionally using here the terms „*spatial data / information / knowledge / intelligence infrastructures*“ (instead of „*geographical*“...) in order to make clear that the challenge in the 21st Century ahead is to re-structure, integrate, and evolve systematically from a *sectoral data based* via an *interoperable infrastructure oriented* into a *high-tech knowledge society* using *spatially enabled*, and distributed *knowledge* to make *intelligent decisions* based on *knowledge resources* of topographic and thematic infrastructures in space&time. The term „*spatial*“... gives here implicitly an abstract definition for geological, geophysical, geochemical, geographical, geomorphological, hydrological, climatological, ecological, environmental, oceanological, social, statistical, medical, historical, territorial, ... etc. datasets/databases which are created, geo-referenced, standardized and updated by different *thematic disciplines*. Specialized *information community sectors* must integrate their spatial resources into *interoperable infrastructures* of networked information systems, which can be accessed online easily by the spatially enabled society in form of *generalized knowledge* and *intelligence services*. Therefore, the *vision* of the future of *topographic and thematic maps*, as well as *time series maps*, and/or *complex thematical atlases* on local, regional, national or global levels will be dominated by *interoperable, interactive, and intelligent data, models, processes, services, and maps* as *cognitive tools* for an informed society (see presentation slide „*Euro SDI.ppt*“ attached).

The actual „*status-quo*“ shows (*examples*: navigation map routing used to reach the conference location at Stresa; the up-dating of metadata catalogues for German and European topographic base map data) that we are still away from such national and European infrastructures and, therefore, we have to built first the framework of a future *Euro.SDI* and its content based on *National SDI* networks.

Finally, to get such a vision realized the *European Countries Union* must integrate, co-operate and get consensus on how to:

- 1) break-down the „*barriers of different semantics*“ between the vertical levels of administrations, governments, industries, academies, and organizations as well as between the horizontal structures of sectors, disciplines, and standards by *interoperable, interactive and intelligent spatial infrastructures* in EC member countries with multi-cultural and multi-lingual traditions;
- 2) break-down the „*barriers of not-awareness*“ of using spatial infrastructures for *knowledge based decision making* by new *education, training and telelearning programs and methods* as for the ‘expert’, as well the ‘non-expert’ citizens in the globalizing GI market of EC;
- 3) break-down the „*barriers of non-availability, non-accessibility or non-interoperability*“ of sectoral and complex thematical datasets or databases by coordination, cooperation, and consensus to create the *Euro.SDI* as an integrated part of the envisioned *Global.SDI* - only then the vision of the future of a „*Knowledge Society*“ will become a reality.

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The GI_Vision... From local to global SDI!

Die Vision einer *kooperierenden* europäischen Gemeinschaft, die ihr räumliches Wissen integriert, mittels *Intelligenter Geo-Umwelt-Raum-Informationen*. Systeme generalisiert, auf *isotoken und statiken* Netzwerken transportiert und mittels *interoperabler* Standards für Meta-Informationssysteme und Geodaten-Infrastrukturen *multivalent* nutzt

