

THE ATLAS TOOLBOX: CONCEPT AND DEVELOPMENT OF A RULE-BASED MAP COMPONENT FOR A GIS-VIS PRODUCTION ENVIRONMENT

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The development and production of maps and atlases is costly and time-consuming. In atlas cartography the atlas toolbox (ATB) is one practical solution to the problem of cost-effective production. In brief, the ATB provides components and modules to compose atlas maps and complete atlases from existing building blocks. Professional map quality is the principal goal of any professional map production, whether analogue or digital. The use of geoinformation systems (GIS) in cartography allows for the production of digital map graphics from the corresponding geometry and attribute data in a geo database. GIS, however, lack both the graphics functionality and quality of graphics or map construction packages, summarised as visualisation systems (VIS). As a consequence, commercial production of quality map visualisations is largely based on VIS. To compensate the shortcomings of GIS in professional map production GIS needs to be complemented with a high-performance VIS frontend.

In this context ATB research is directed to engineer and automate quality map production in a GIS-VIS environment. This can be accomplished by conceptualising a framework of rule-based quality map production using the modular principle. An integral part of the VIS system the development and implementation of such modules will strengthen systematic, component-based map production as well as optimal visualisation of map data. While the GIS-VIS environment can be considered the technical software basis of professional map production, the ATB provides methods, rules and components for the appropriate applications of both systems. To account for the variety of tasks characteristic in atlas and map production the ATB is made up of several components, of which the map component is discussed in more detail.

The map component is broken down into a number of modules which, in turn, are composed of a number of stacks, each of which consists of an array of cards. This structure is generic which allows for a flexible task-oriented adaptation of the production environment for specific application. If required, new modules, stacks and/or cards can be added to the existing modules and stacks, respectively. Each card consists of a number of elements which can be considered the basic building blocks of a map. New elements can be added to any one card if necessary. Attributes can be attached to each element for further differentiation. Modules are ordered in a linear sequence which basically mirrors the production steps of the map compilation process. To accommodate for a more flexible map production process, stacks, cards and elements of each module can easily be connected by hyperlinks. This, in principle, allows each card of every stack of each module to interact with any other card in any other stack of each module. To facilitate quality map generation the ATB restricts the range of interconnections to cartographically correct combinations of cards, stacks and elements, as will be shown in the presentation.

The discussion and exemplary application of the ATB map component in a GIS-VIS map production environment shows that systematic, rule-based construction of quality maps can both be upgraded in terms of quality and accelerated in terms of production time. The modular principle makes it feasible for cartographic businesses, particularly of the SME type, to offer quality map productions services at competitive costs. For the geoscientist a modified ATB provides a professional mapping environment facilitating cartographic visualisations which comply with the fundamental principles of (thematic) cartography and thus are simply effective.