

Preface

It is expected that in many countries digital broadcasting systems will mostly replace current FM radio and television technology in the course of the next one or two decades. Thus digital broadcast networks will become an important cornerstone of the global network infrastructure of the 21st century. The digital media do not only offer superior image and audio quality and interesting new types of multimedia data services “on the air,” but also have the potential to employ the scarce resource of broadcast frequencies much more efficiently. However, to fully exploit these capabilities, new planning methods are required.

The DAB (Digital Audio Broadcasting) system has been developed in Eureka Project 147 since 1987 and was specified 1995 in the European standard ETS 300401. Among the experts DAB is now widely accepted as the best of the mature digital radio broadcasting systems currently available, and it is also the system recommended by the International Telecommunications Union (ITU). DAB broadcast networks are currently being deployed in many countries, with the notable exception of the United States, which are introducing their own “IBOC” (“In-Band-On-Channel”) system, and Japan which is still considering different alternatives. Other countries like China also have plans to use the DAB system.

In 1997, when several DAB pilot networks were already operative in Germany, we embarked on a joint project with the SWR (Südwestrundfunk) public broadcasting company to develop new planning algorithms for DAB networks. This research is carried out in the context of the “Research Association for Media Technology South-West,”¹ a long-term research program which aims at developing the know-how in media technology in the South-West of Germany. The program was launched in 1991 by the two German states Baden-Württemberg and Rhineland-Palatinate. Besides the SWR, it involves three universities and several companies from the two states, which gives researchers an opportunity to do interdisciplinary work on demanding real-world problems in many areas of modern media technology.

One of the main goals of our project was the implementation of an interactive software environment for testing different algorithmic solutions for DAB ensemble and block assignment planning. This software, called *DABTool*, enables us to run systematic test series on both real-world planning problems and randomly generated test instances. The current version of the software now provides all necessary facilities to handle large test series, including a database interface. The basic algorithmic techniques for computing ensemble collections, block assignments, and lower bounds for estimating the quality of computed solutions are implemented as well. More advanced algorithms will be added in the future. This paper reports on the results of this work. It first discusses the theoretical background of the system, after which the current version of the DABTool program is described in some detail.

¹“Forschungsverbund Medientechnik Südwest,” abbreviated as FMS. See <http://www.inue.uni-stuttgart.de/FMS/> for more information.