

广播与电视技术

2018 4
第二届全国期刊奖百种重点期刊

Radio & TV Broadcast Engineering

全国百种重点期刊 专业核心科技期刊

第45卷 第4期 VOL.45 NO.4



中国广电认证

中国广播电视行业自愿性广播电视产品第三方认证机构

传递信任 服务发展

截至2018年3月31日以下企业入户型光接收机、EPON 系统设备等 **光纤到户产品** 获“中国广电认证”



(企业排名不分先后)

电话: 010-86093454 / 86093761

电子邮件: rzzx@abp2003.cn

通信地址: 北京市西城区真武庙二条真武家园4号楼(100045)

ISSN 1002-4522



9 771002 452005

国家新闻出版广电总局 主管

国家新闻出版广电总局广播电视规划院 主办



主管：国家新闻出版广电总局
主办：国家新闻出版广电总局广播电视规划院

邮发代号：82-464

编辑出版：广播电视规划院信息研究所
主 编：谢锦辉
顾问主编：赵兴玉
执行主编：何剑辉
副 主 编：卢 群
编 辑：房 磊 王海平
王贵琴
市场总监：谢 婧
发 行 者：胡 南
美 编：沙永丽

通讯地址：北京 2116 信箱 (100866)
电 话：010-86093619 (编辑部) 010-86092081 (市场部)
010-86092040 (发行部)
传 真：010-86093592
投稿网址：tougao.lieku.tv
国内总发行：北京报刊发行局
订 购 处：全国各地邮局
国外总发行：中国出版对外贸易总公司 (北京 728 信箱 100011)
广告经营许可证：京西工商广字 0029 号
国内定价：20.00 元 / 本 国外定价：20 美元 / 本
刊 号：ISSN 1002-4522
CN11-1659/TN

目 次

全国百种重点期刊 专业核心科技期刊
tougao.lieku.tv



2018 年 | 第 45 卷 | 第 4 期

特别报道

16 智慧共享 绿色发展——2018 三院论坛在京成功召开

地面电视全数字频率规划

19 我国地面电视全数字频率规划原则与方法

刘骏, 李雷雷, 孙红云, 范晓菲

23 我国地面电视全数字频率规划方案解读

孙红云, 李雷雷, 范晓菲, 代明

热点·论点

融媒体制播

27 广电融媒体中心“中央厨房”的设计与实施

陈晓东, 高永飞

30 媒体融合过程中“中央厨房”业务模式探讨

王宇彤

36 “融媒体”时代高清新闻直播系统的设计与应用

林熹

大家之言

42 相关行业技术进展与广电有线网络发展的思考

王飞, 鞠宏, 付晶, 董彬, 周志强, 周毅

快言快语

47 打铁还需自身硬——有线四大基础能力决定未来成败

罗小布

内容制播

49 融媒体新闻生产平台建设思路及业务流程设计

赵腾, 赵豪

56 基于人工智能的中文语音文本智能编辑系统设计

牛嵩峰, 唐炜

61 调音台等效输入噪声的测量

孙岩, 张建东, 何莹

64 基于多业务传输平台的广播音频远程传输系统

魏健浩

68 三维网络在线包装字幕系统的建设与应用

王五生, 孙长勇

72 演播室灯光在电视节目录制中的作用

孟庆民



《广播与电视技术》是由国家新闻出版广电总局主管，国家新闻出版广电总局广播电视规划院主办，信息研究所编辑出版的国家级技术期刊；是发布广播电视科技政策，反映事业建设成就，介绍高新技术，交流工作经验，传播各种信息的重要媒体。本刊主要面向各级广播电视行业主管部门、各级广播电台、电视台、网络公司、发射台、微波站、卫星站、节目制作单位及电教系统，同时对企业、工矿、学校、部队等具有公共广播电视设施的管理人员、技术人员也有参考价值。

为繁荣学术交流，本刊已加入《中国学术期刊网络出版总库》、“万方数据”和“维普中文科技期刊数据库”，有权选取部分论文在本刊关联平台（如广电猎酷网 www.lieku.tv、“广电猎酷”微信公众号等）发布，作者著作权使用费已随论文稿酬一次性给付。本刊充分尊重作者的原创成果并合理保护作者享有的权利，如作者不同意本刊之外其他形式的发布，请在来稿中声明，本刊将作适当处理。本刊及主办单位对本刊已发布作品的内容和观点不持有任何立场、不做出任何承诺或保证、不承担任何责任。

目次

全国百种重点期刊 专业核心科技期刊

tougao.lieku.tv



中国邮政
微信订阅

2018年 | 第45卷 | 第4期

有线网络

- 75 基于广电 IT 支撑规划的网络资源管理系统外部接口设计与实现 **郭皓**
- 84 广电 BOSS 系统中客户地址体系的建设与应用 **孙大伟**
- 87 基于 IP 架构的 OTN 节目分发系统的设计与实现 **梁刚毅**
- 90 基于 TVOS 的融合媒体集团客户云服务平台建设 **钱文轩, 杨晨, 李蓓佳, 吴乙雨**
- 94 IP 数字广播播出系统的质量与监测 **莫占林**

无线覆盖

- 97 中波发射台的地波场强测定与数值模拟方法 **许晓春**
- 100 基于音频信号比对的无线广播节目智能监测系统 **刘春江**
- 105 隧道覆盖调频选频处理器的设计 **陈宸, 陆建华**
- 109 一种应用于 26MHz 频段的天线小型化设计 **盛国芳, 赵长青, 吴智勇**

安全播出与监测监管

- 113 IPTV 集成播控平台安全防范技术探讨 **盛诚**
- 117 电视台内外网文件安全交互系统设计与实施 **马莉新**
- 120 运用分布式 IP 画面云系统实现各类监测信号的智能化调度与展示 **陈功**

论述·点评

- 125 融媒体时代电视发展的问题分析 **贾中原**

CCBN 展会报道 P131

业界纵横 国内简讯 P161 国外动态 P163 厂商专讯 P165

广告索引 P168



主管：国家新闻出版广电总局
主办：国家新闻出版广电总局广播电视规划院

邮发代号：82-464

全国百种重点期刊 专业核心科技期刊

导 读

tougao.lieku.tv

中国邮政
微信订阅



2018年 | 第45卷 | 第4期

〔19〕 我国地面电视全数字频率规划原则与方法

按照总局规划部署，我国将在“十三五”期间适时关闭模拟电视信号，完成地面电视向数字化转换。当前正处于地面电视模数转换的关键阶段，各地一方面要保证地面电视模拟信号的安全播出，同时还要积极建设地面数字电视系统，同步开展地面数字电视服务。频率是地面电视播出最基本的资源，科学、合理、高效地规划频率资源是顺利完成地面电视模数转换的前提。本文全面调研了全国地面电视频率状况，结合我国地面模拟、数字电视的频率占用状况和未来地面数字电视业务应用需求，研究确定了全数字时期的频率规划目标，对于我国地面电视全面数字化具有重要的参考价值。

〔27〕 广电融媒体中心“中央厨房”的设计与实施

如何利用广电媒体优势建设有广电特色的中央厨房是广电在媒体融合的大潮中需要考虑的主要问题。浙江广电集团融媒体中心“中央厨房”实现了“电视+新媒体+广播”的多形态传播以及异构平台上视频内容的协同生产发布；可通过新闻大数据深度分析处理实现采编发高效的联动生产，达到对重大事件的预先判断以及事后有效分析；融合创新了广电新媒体优势创新运行体制机制，可供业界参考。

〔42〕 相关行业技术进展与广电有线网络发展的思考

云计算、大数据、人工智能、物联网、移动互联网等现代信息技术的发展正在加速推进广电网络与互联网、通信网的融合。本文基于对网络相关行业和技术的最新进展及趋势的介绍，从竞争态势上分析了广电有线网络的发展现状及面临的挑战和五个发展机遇。同时，提出了在文化强国、网络强国战略背景下广电有线网络后续发展的思路与对策，可资参考。

〔49〕 融合媒体新闻生产平台建设思路及业务流程设计

甘肃省广电总台顺应媒体融合创新发展趋势，基于新闻生产业务需求，规划建设了“甘肃省广电总台融合媒体新闻生产平台（中央厨房）”。该平台设计遵循电视台技术平台IT化、IP化、云化规律，积极运用大数据、云计算等新技术，达到安全高效、可管可控，同时具有一定的技术前瞻性。本文介绍这一系统，供同行参考。

〔84〕 广电BOSS系统中客户地址体系的建设和应用

当前，广电网络公司的业务模式逐步拓展为基于自然人的客户关系管理模式，而传统广电业务基于地址的业务运营管理在现实生产运营中也存在着一定的不可替代性。如何将两种管理模式有机结合起来，使广电BOSS系统具备自然人管理与地址管理的双重特征是一个值得研究探索的问题。本文提出了一种解决思路，可资业界同行参考借鉴。

〔97〕 中波发射台的地波场强测定与数值模拟方法

中波发射台覆盖场强测定一般是通过车载中短波调频场强仪测量，但在待测场强区域分布太广或者收测点地理环境不易开展实地收测等情况下，需要通过已知区域的场强信息来计算周边区域场强数据。本文设计提出了地波场强计算模型与数值模拟方法相结合的场强预测方法，通过与浙江33个发射台实际场强测量情况比对，证明了该方法可行。

〔113〕 IPTV集成播控平台安全防范技术探讨

与传统电视节目相比，IPTV集成播控平台面临更多、更复杂的安全问题，原有传统媒体的安全机制和管理体系已不能满足实际需要。所以，如何提高IPTV集成播控平台的整体安全防范能力是广电部门面临的重大课题。本文结合当前IPTV集成播控平台的环境现状和环境特点，分析了目前可能存在的安全风险，提出了相应的安全策略。



Competent Authority:
State Administration of Press, Publication, Radio, Film and Television
Sponsor: Academy of Broadcasting Planning, SAPPRFT

Publisher: *The Institute of Information Research, ABP*

Chief Editor: *Xie Jinhui*

Consultant Chief Editor: *Zhao Xingyu*

Executive Chief Editor: *He Jianhui*

Deputy Chief Editors: *Lu Qun*

Editors: *Fang Lei Wang Haiping*

Wang Guiqin

Advertising Director: *Xie Jing*

Circulation Coordinator: *Hu Nan*

Art Editor: *Sha Yongli*

Tel: (86-10) 86093619 (Editor)

(86-10) 86092081 (Market)

(86-10) 86092040 (Circulation)

Advertising: (86-10) 86091604

Fax: (86-10) 86093592

Web Address: tougao.lieku.tv

Address: P.O.Box 2116, Beijing, P.R.China

Post Code: 100866

Postal Distributing: Code 82-464

Journal Number: ISSN 1002-4522 / CN11-1659/TN

Prices: RMB 20 for one copy (in China)

USD 20 for one copy (outside China)

Contents

One of Hundred National Key Periodicals
A Core Professional Sci-Tech Periodical
tougao.lieku.tv

April 2018 No.4

Special Report

16 Intelligent Sharing, Green Development —— 2018 The Three Institutes Forum of SAPPRFT Successfully Held in Beijing

All-Digital Frequency Planning for DTMB

19 Principles and Methods of the National DTMB All-digital Frequency Planning *By Liu Jun, Li Leilei, Sun Hongyun, Fan Xiaofei*

23 Interpretation of the National DTMB All-digital Frequency Planning Scheme *By Sun Hongyun, Li Leilei, Fan Xiaofei, Dai Ming*

Convergent Media Production and Broadcasting

27 Design and Implementation of "Central Kitchen" in Convergent Media Center *By Chen Xiaodong, Gao Yongfei*

30 Discussion on the Business Model of "Central Kitchen" in Media Convergence *By Wang Yutong*

36 Design and Application of HD Live News System in Convergent Media Era *By Lin Xi*

Master's Words

42 Thinking of the Development of CATV and Related Industries *By Wang Fei, Ju Hong, Fu Jing, Dong Bin, Zhou Zhiqiang, Zhou Yi*

Straightforwardness

47 To Forge Iron, One Must be Strong—— The Four Fundamental Abilities Bring Future for CATV *By Luo Xiaobu*

Content Production & Broadcasting

49 Construction of Convergent Media News Production Platform and Business Process Design *By Zhao Teng, Zhao Hao*

56 Design of Chinese Text and Audio Editing System Based on AI *By Niu Songfeng, Tang Wei*

61 Equivalent Input Noise Measurement in Audio Mixing Console *By Sun Yan, Zhang Jiandong, He Ying*

64 Remote Audio Transmission System Based on MSTP Network *By Wei Jianhao*

68 Construction and Application of 3D Online Packaging Caption System *By Wang Wusheng, Sun Changyong*

72 Studio Lighting for TV Program Production *By Meng Qingmin*

CATV

75 Design and Implementation of NRMS Interface Based on IT Specification *By Guo Hao*

84 Construction and Application of Customer Address System in CATV BOSS *By Sun Dawei*

87 Design and Implementation of OTN Program Distribution System Based on IP Architecture *By Liang Gangyi*

90 Convergent Media Group Customer Cloud Service Platform Based on TVOS *By Qian Wenxuan, Yang Chen, Li Beijia, Wu Yiyu*

94 Quality Optimization and Monitoring of IP Digital Broadcasting System *By Mo Zhanlin*

Wireless Coverage

97 Ground-wave Field Strength Measurement and Numerical Simulation Method for MW Station *By Xu Xiaochun*

100 Radio Program Intelligent Monitoring System Based on Audio Comparison *By Liu Chunjiang*

105 Design of FM Frequency Selective Processor for Tunnel Coverage *By Chen Chen, Lu Jianhua*

109 Design of Antenna Miniaturization Applied in 26MHz Band *By Sheng Guofang, Zhao Changqing, Wu Zhiyong*

Safety Broadcasting & Monitoring

113 Discussion on Security Technology for IPTV Integrated Broadcasting Control Platform *By Sheng Cheng*

117 Network File Interaction Security System in TV Station *By Ma Lixin*

120 Intelligent Scheduling and Display of Monitoring Signal Based on Distributed IP Image Cloud System *By Chen Gong*

Elaboration & Commentary

125 Analysis of TV Industry Development in the Era of Convergent Media *By Jia Zhongyuan*



Competent Authority:

State Administration of Press, Publication, Radio, Film and Television

Sponsor: Academy of Broadcasting Planning, SAPPRT

Radio & TV Broadcast Engineering (RTBE) is a state-class technical journal, approved by the General Administration of Press and Publication, PR of China, authorized by the State Administration of Press, Publication, Radio, Film and Television (SAPPRT), PR of China, sponsored by Academy of Broadcasting Planning (ABP), SAPPRT, and published by the Institute of Information Research, ABP. RTBE is an important medium, that publishes scientific and technological policies in broadcasting, reports achievements in building broadcasting cause, introduces high and new technologies, exchanges work experience and spreads various information. RTBE is mainly geared to the needs of departments responsible for the work of radio & TV industry at all levels, radio & TV stations at all levels, network companies, transmitting stations, microwave stations, satellite stations, program production units and electrified education systems, as well as is of reference value to managerial and technical personnel for public radio & TV facilities in industrial and mining enterprises, educational institutions, troops and so on.

One of Hundred National Key Periodicals

A Core Professional Sci-Tech Periodical

tougao.lieku.tv

Index

April 2018 No.4

[19] Principles and Methods of the National DTMB All-digital Frequency Planning

According to the State Administration of Radio and TV's deployment, China will stop the analog TV broadcasting during the 13th Five-Year, and will transform to digital terrestrial TV broadcasting. It is right now an critical stage of DTMB development. The analog terrestrial TV programs need to be safely broadcasted, while the digital territorial TV system is being constructed for digital TV services. Frequency is the fundamental resource of DTMB. How to make a scientific, reasonable and efficient frequency plan is the premise of a successful transformation for DTMB. This paper gives a comprehensive survey of the country's terrestrial television frequency. Combined with the frequency occupancy and the business requirement in future, it studies the goal of frequency planning in the all-digital era. It is an important reference for a comprehensive digitalization of terrestrial TV in China.

[27] Design and Implementation of "Central Kitchen" in Convergent Media Center

In media convergence, the major issue is how to make use of the advantages of radio and television to build a "central kitchen" with radio and TV features. The "central kitchen" of Zhejiang Radio & TV Group realized the multi-communication of "TV & new media & radio" and a collaborative production and broadcasting of video content on heterogeneous platforms. It could achieve an efficient linkage of collection, editing and broadcasting through the news data's depth analysis, in order to pre-judge the important events, as well as effective analysis afterwards. It is an innovation of new media operation system and mechanism as a reference for the industry.

[42] Thinking of the Development of CATV and Related Industries

The development of modern information technology, such as cloud computing, big data, artificial intelligence, Internet of things and mobile Internet, is accelerating the integration of CATV network with the Internet and communication networks. This paper introduces the latest development of network related industries and technologies, analyzes the development status, challenges and five opportunities of CATV network in the competitive situation, and puts forward the idea and strategy of CATV network in the follow-up development under the background of strong culture and powerful network. Hope to be reference.

[49] Construction of Convergent Media News Production Platform and Business Process Design

Gansu Radio and TV Station built up a convergent media news production platform (Central Kitchen), which conforming to the media integration and innovation and the demand of news production business. This platform follows the rule of IT, IP and cloud transformation, using big data and cloud computation technology to reach a safe, efficient, manageable, controllable and prospective platform. This paper introduces the platform, for references.

[84] Construction and Application of Customer Address System in CATV BOSS

At present, the business model of CATV is gradually developed to a customer management based on natural person, while the traditional business operation management based on equipment address is also irreplaceable in the actual production and operation. How to combine those two management modes is worthy of research and exploration, to make the BOSS with dual characteristics of natural person and equipment address. This paper puts forward a solution, which can be used for reference by industry peers.

[97] Ground-wave Field Strength Measurement and Numerical Simulation Method for MW Station

MW field strength is generally measured by an in-vehicle medium- and short-wave FM field strength meter. But when the field strength distribution is too wide, or the receiving geographical environment is not suitable for the measurement, we need to calculate the field strength in case of the known field strength of the surrounding area. This paper puts forward a field strength prediction method, in which the ground wave field strength calculation model is combined with the numerical simulation method. This method is proved to be feasible by the comparison with the actual field strength measurements at 33 transmitting stations in Zhejiang province.

[113] Discuss of Security Technology for IPTV Integrated Broadcasting Control Platform

IPTV integrated broadcasting platform is facing with many security problems, compared to the traditional TV broadcasting. The original security mechanism and management system of the traditional media are no longer unable to meet the actual needs. Therefore, how to promote the security of the IPTV integrated broadcasting platform is an important issue for the administrator of radio and TV station. Combined with the environmental situation and the characteristics of IPTV integrated broadcasting platform, this paper analyses the possible security risks and proposes corresponding security solutions.