

# PROCEEDINGS OF THE 2ND INTERNATIONAL CONFERENCE ON PERSONAL, MOBILE AND SPREAD SPECTRUM COMMUNICATIONS

Hong Kong Convention & Exhibition Centre  
December 3-5 1996  
Hong Kong

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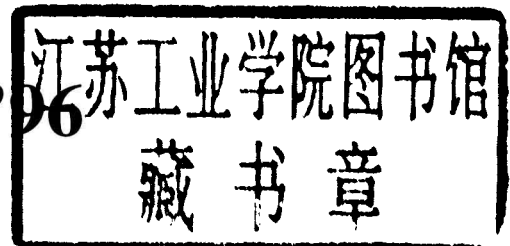
CHINA INSTITUTE OF  
COMMUNICATIONS  
(CIC)



THE INSTITUTION OF  
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HONG KONG

**Proceedings**  
**of the**  
**2<sup>nd</sup> International Conference on**  
**Personal, Mobile and Spread**  
**Spectrum Communications**

**ICPMSC '96**



**Hong Kong Convention & Exhibition Centre**  
**December 3-5 1996**  
**Hong Kong**

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## **General Co-Chairmen's Message**

On behalf of the Organising Committee, we would like to extend my warmest welcome to participants of the Second International Conference on Personal, Mobile and Spread Spectrum Communications to Hong Kong.

Personal and mobile communications are among the highest growth sectors in the communications industry, and spread spectrum technique is one of the enabling technologies. The conference is aim at providing a forum for engineers, service vendors, academics and students from all over the world to exchange their ideas and research results. Papers contained in this proceeding exemplified the diversity and significant progress made by leading researchers in these fast growing fields recently. In addition they are being organised into eighteen sessions covering a wide range of topics. There are four keynote papers to be presented by the world's most renowned experts. They are Prof. Peter A Ramsdale of Mercury One 2 One, Dr. William C.Y. Lee of AirTouch Communications, Mr. Lou Hairi of Commission of Science and Technology, Ministry of Post and Telecommunications and Prof. Victor O.K. Li of University of Southern California.

The excellent technical program of ICPMSC'96 is a direct result of the hard work and dedication of many individuals. We would therefore like to take this opportunity to thank all the members of the Technical Committee, the reviewers, and most of all, the authors for contributing their works and presenting them at the conference.

Of course the Conference cannot possibly be successful without the dedicated contribution of members of the Organisation from both the IEE and CIC. We also appreciate deeply the generous financial support provided by our sponsors. For any conference, there are always many individuals who have put in their valuable time and effort to make it successful and this one is no exception. To those silent workers, we would like to record our appreciation.

Connecting individuals through true Personal Communication Services in the future will have a significant impact on the world as we know it today. We hope you will find ICPMSC'96 both stimulating, and rewarding as most participants are involved in the development of technology and theory that will be implemented by PCS in the future. Finally we encourage you to enjoy the hospitality of Hong Kong, to renew your acquaintances and to meet new individuals in your field.

T.S. Ng  
M.H. Au  
General Co-Chairmen

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The Institution of Electrical Engineers (IEE) Hong Kong

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# ICPMSC '96 PROGRAM OVERVIEW

- Tuesday, 3 December 1996 -

8:30 - 9:00	Registration	
9:00 - 9:20	Opening Ceremony	
9:20 - 10:30	Keynote Speech I & II	
10:30 - 10:50	Tea Break	
10:50 - 12:30	Acquisition, Tracking and Interference Rejection I	Mobile Traffic and Hand-Off Issues I
12:30 - 14:00	Lunch	
14:00 - 15:40	Acquisition, Tracking and Interference Rejection II	Mobile Traffic and Hand-Off Issues II
15:40 - 16:00	Tea Break	
16:00 - 17:40	CDMA Techniques	Mobile and Satellite Systems

- Wednesday, 4 December 1996 -

9:00 - 10:10	Keynote Speech III & IV	
10:10 - 10:30	Tea Break	
10:30 - 12:30	Channel Modelling and Radio Link Performance	Multiple Access Techniques
12:30 - 14:00	Lunch	
14:00 - 15:40	CDMA Performance Analysis I	Transmitter and Receiver Techniques I
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16:00 - 17:00	CDMA Performance Analysis II	Transmitter and Receiver Techniques II
18:30 - 22:00	Conference Banquet	

- Thursday, 5 December 1996 -

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9:50 - 12:30	DS, FH and Hybrid Systems	Multi-User Detection
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16:00 - 17:40	Network Aspect II	Coding and Modulation II

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## THE FUTURE OF PERSONAL COMMUNICATIONS NETWORKS

P A Ramsdale  
One 2 One  
UK

**Abstract** - *The rapid growth of personal communications networks has been due as much to marketing and regulatory changes as to the introduction of second generation, digital cellular radio technology. The traditional boundaries between fixed and mobile networks and between consumer and business services have been crossed.*

*In the near future, dual-mode handsets will link networks based on cordless, cellular, satellite and fixed network technologies. Third generation standards will continue this integration and extend the range of services, including those requiring higher speed data.*

*Personal mobile radio systems will provide the primary access to the 'Information Society' in which the availability of all forms of information, anytime, anywhere will revolutionise lifestyles.*

### 1. INTRODUCTION

Personal communications operators provide high-quality communication services to both business users and consumers, on the move outdoors and indoors. The development of personal communications has not just been a change in mobile network technology and its deployment but also the introduction of new service concepts. Advanced network solutions are required to deliver a high-capacity service for speech, data and supplementary services from a competitive cost base to provide personal communication services which can compete across fixed and mobile markets.

The key trends for the future are:-

- mobility, with radio based handsets continuing to increase their market share
- integration of separate mobile and fixed networks
- convergence of telephony, data, information and broadcasting
- 'Information Society' which will revolutionise lifestyles through the delivery of information services, anytime, anywhere

### 2. PERSONAL COMMUNICATION NETWORKS

Personal Communication Networks (PCNs) first started in the UK through the government wanting new services to compete with the mobile cellular operators in the short term and the local loop, dominated by BT in the longer term. Subsequently other countries have awarded PCN licences to increase competition.

Although new technology and improvements to networks are important factors the dramatic growth in personal communications in the UK has been achieved predominantly by service positioning. The rapid take-up of the service offered by the 1800 MHz digital networks of the two new PCN operators has been matched by an unprecedented growth of customer numbers on the existing 900 MHz analogue cellular networks. Establishment of 900 MHz digital GSM as a premium service for Pan-European roaming was slower but is now adding customers faster than the analogue networks.

Figure 1 considers the service positioning which has driven personal communications take-up. Traditionally, different forms of telecommunication