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Finn Arve Aagesen  
Chutiporn Anutariya  
Vilas Wuwongse (Eds.)

# Intelligence in Communication Systems

IFIP International Conference, INTELLCOMM 2004  
Bangkok, Thailand, November 2004  
Proceedings



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# Intelligence in Communication Systems

IFIP International Conference, INTELLCOMM 2004  
Bangkok, Thailand, November 23-26, 2004  
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## Preface

The 2004 IFIP International Conference on Intelligence in Communication Systems (INTELLCOMM 2004), held in Bangkok, Thailand, 23–26 November 2004, was the successor and an expansion of SMARTNET, a series of annual conferences on intelligence in networks held during 1995–2003 under the auspices of IFIP TC6's Working Group 6.7. The Internet and Web provide more connection facilities, hence the man-man, man-machine and machine-machine interactions will increase and communication will have an important role in modern systems. In order to obtain effective and efficient communication, artistic, social and technical issues have to be tackled in a holistic and integrated manner. However, communication techniques, concepts and solutions which have been developed so far treat these issues separately, so that there arises a need for communication researchers and practitioners in different fields (engineering, science and arts) to meet, share their experience and explore all possibilities of developing integrated and advanced solutions which incorporate ideas from such disciplines as communication arts, art design, linguistics, Web technologies, computer system architecture and protocols, computer science and artificial intelligence.

INTELLCOMM 2004 was jointly sponsored by IFIP WG 6.7: Smart Networks and WG 6.4: Internet Applications Engineering and aimed to provide an international forum which brings academia, researchers, practitioners and service providers together. The discussion areas covered the latest research topics and advanced technological solutions in the area of intelligence in communication systems, ranging from architectures for adaptable networks/services and Semantic Web/Web services technologies to intelligent service application interface and intelligent human interaction.

INTELLCOMM 2004 received 112 paper submissions from 28 countries. From these, 24 were accepted, and are included in this proceedings. There were also 3 papers accepted for poster presentation, published separately. The technical program comprised one day of tutorials, followed by keynote speech, paper and poster sessions.

The tutorial sessions were arranged with the topics: “Intelligence in Communication Systems: Evolution, Trends and Business Opportunities,” “Open Mobile Services,” “QoS and Security in the Embedded Internet,” “Metadata Development” and “Ontology Engineering”.

The speakers and topics of the five keynote sessions were: Dr. Reda Reda from Siemens AG in Germany: “Intelligence in Communication Systems, the Business Point of View,” Prof. Toyooki Nishida from the University of Tokyo in Japan: “Conversational Knowledge Process for Social Intelligence Design,” Prof. Guy Pujolle from the University of Paris in France: “Smart Router and Intelligent Protocol,” Prof. Dieter Fensel from the University of Innsbruck in Austria: “Triple-Space Computing: Semantic Web Services Based on Persistent Publication of Information,” and Prof. Lill Kristiansen from the Norwegian University

of Science and Technologies in Norway: “Mobility and Intelligence in Telecom: How and Where to Handle It?” The materials of the keynote speeches are also included in this volume.

The eight technical paper sessions were arranged on: “QoS and Security,” “Intelligent Communication Systems with NLP,” “QoS,” “Location and Context-Aware Services,” “Protocol and Application Architecture,” “Semantic Web and Service Architecture,” “Adaptability Architecture” and “Network and Mobility Management.”

Many people contributed to the organization of this conference. We thank the members of the Program Committee for their continuous advice and help in reviewing and selecting papers. We would also like to thank IFIP TC6 and the corporate patrons for their support of this conference. Finally, we would like to express our gratitude to the Organizing Committee Advisor Dr. Manoo Ordeedolchest and the Organizing Committee for their excellent work.

November 2004

Finn Arve Aagesen  
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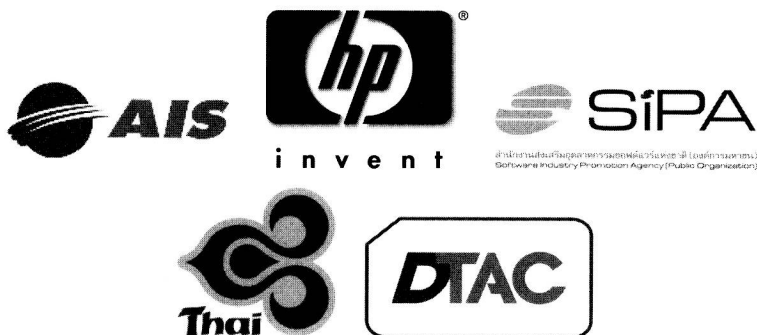


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# Intelligence in Communication Systems Evolution, Trends and Business Opportunities

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**Abstract.** This paper reports the findings of recent studies on the impact of intelligence in modern/future-oriented telecom networks. The ICT/telecommunication market evolution and future trends are presented. Subsequently, the business opportunities are also discussed. The main drivers for the evolution as well as market success are mobility, security, and intelligence in the network.

Though the global economy is still far from recovery, analysts expect the world telecom market in 2004 to exceed 1,000 billion Euros, with an impressive annual growth rate of between 3% and 4%

Current security threats and security fiascos reveal the fact that, in spite all innovative and advanced security solutions offered by renowned companies, the security market is still quite promising. There are big business opportunities for mature solutions involving intrusion detection systems, fire walls, antivirus systems, encryption and secure mobility.

The evolution towards mobility is currently passing from third-generation to fourth-generation, milli-wave LAN and HAPS solutions in the next decade. Considering the technological evolution and the current trends, the telecommunication market will present excellent opportunities for intelligent solutions and products that provide maximum bandwidth with optimal mobility, convergence between mobile and fixed networks, connectivity on demand, and finally build, transfer, optimize, manage and operate the network.

## 1 Introduction

The ICT market represents almost 39% of the total world electronics market. 55% of which are generated by the telecommunication industry. Thus the telecom business is the main driving force for progress of the electronics industry and subsequently for the global economical and technological progress. This paper will report on the impact of intelligence in modern/future-oriented telecom networks, and technological trends, subsequently, the business opportunities are discussed.



## 2 ICT Market

The development and growth of the Information and Communication Technology (ICT) market over the recent years has been exceptional, perhaps even unique in the history of industrial change, despite the global economical disaster, and despite the political instability.

While the markets in Europe are still struggling with the aftermath of the global economic downturn, the US economy is showing strong signs of recovery.

### 2.1 Development of the ICT World Market

The ICT world market in 2003 exceeded the magic 2.000 Billion-Euro mark, with a quite impressing unexpected annual growth rate of 1.4 % as follows:

- + 1.2 % for Europe,
- 0 % for USA,
- − 0.8 % for Japan and
- + 4.8 % for Rest of the World (RoW).

For 2004, the annual growth rate of ICT world market is expected even to exceed the value of 3%. (3%-4%).

Considering the split out of the ICT market, the telecom market resembles more than 55% of the ICT market, whereas the IT is less than 45% (see Fig. 1).

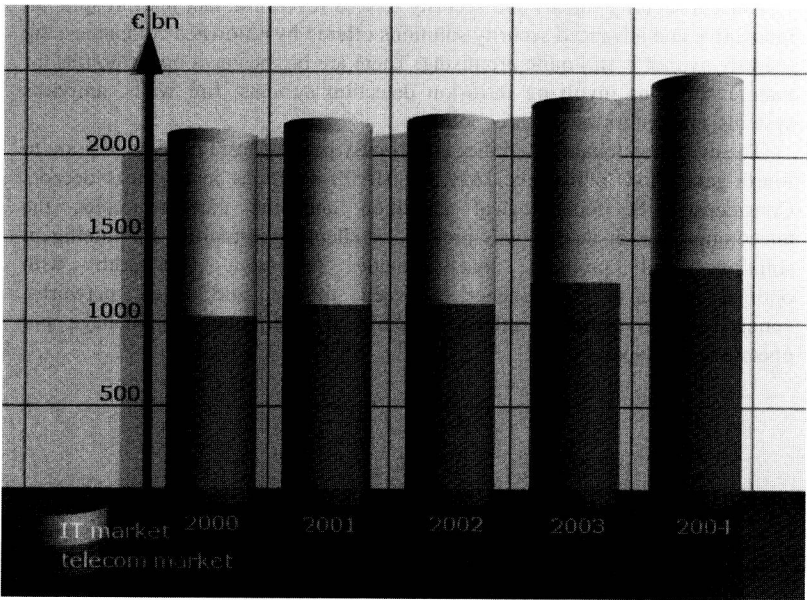


Fig. 1. Worldwide ICT Market. Growth (2000–2004)