

十一、研究計畫中英文摘要：請就本計畫要點作一概述，並依本計畫性質自訂關鍵詞。

(一) 計畫英文摘要。(五百字以內)

Keywords: *Multimedia wireless communication, Cross-layer optimization, Joint-source-channel coding, Overlay network, Electronics System Level design and verification*

With the rapid advances in multimedia entertainment, broadband network, and semiconductor manufacturing technologies, high-speed all-IP multimedia wireless communication is coming of age. The WiFi (802.11a/b/g/n) and WiMAX (802.16/16e) technologies are becoming sophisticated and affordable. People are expected to have ubiquitous wireless Internet access in the urban areas in the foreseeable future. Leveraging the already rising voice over IP (VoIP) services, multimedia over IP (MoIP) is anticipated to be the killer application to thrive in the future. Despite the positive prospective of MoIP, the key to the successful deployment of MoIP services lies in the quality of services (QoS) and the foremost technical challenge is at the scalability of the MoIP communication system, with which it is possible to satisfy the user demand while the user population continues to grow.

Combining expertise in communication software development, hardware IP development, and system design verification, we propose an innovative high-performance handheld system for MoIP applications. The system is referred to as the “NTU Skype (N-Skype)”. We will first define the specification of the MoIP handheld system, and then develop the required hardware IPs and network software. We will also integrate the hardware and software modules and realize the system in an FPGA-based prototyping platform.

The key technologies to develop in this project include: (1) QoS optimization across application, network, and data link layers, (2) joint-source-channel coding Silicon IP, (3) Adaptive coding and data transmission over alternative path via overlay network, and (4) electronics system level hardware-software co-design and co-verification. We believe that our experience in MoIP handheld system specification and hardware/software IP development will be valuable to the multimedia wireless communication industry and will impact profoundly the MoIP market in the future.