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Designing Mobile Phones and Communicators for Consumers' Needs at Nokia

Have you ever wondered what makes mobile phones easy to use? These small devices pose interesting design challenges. The user interface design must map functions, such as saving or selecting phone numbers, to key presses in a way that will seem intuitive to users. The usability of both the handheld terminal and the associated telephony services depends on effective interaction methods and in general, novel ways of using multimedia in mobile communication. In addition, the key presses must be intelligible to different languages and cultural groups. The keys must also work in a variety of challenging physical settings. In a forthcoming book¹ on the design of information appliances, members of the user interface team at Nokia describe their process for designing mobile phones and other mobile communication devices. We have excerpted a portion of the chapter where the authors give us a glimpse into the future.

— *Kate Ehrlich, column editor*



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Design and Evaluation of Mobile Terminals

The creation of mobile phones and communicators has been heavily influenced by the special business environment that currently dominates mobile communication. At the turn of the millennium, this business environment can be characterized by

- ★ A constant rush and need to bring to market innovative terminal models (also for specific target markets),
- ★ The speed at which the technology (e.g., networks and input-output) is developing,



Figure 1: The Mobira Cityman, a Nokia Mobile Telephone from the 1980s (left) and the Nokia 6110, a cellular phone from the late 1990s (right)

- ★ The existence and development of various network standards.

As a market leader among mobile terminal manufacturers, Nokia is helping to create the future of mobile communication. New technologies are constantly being explored for their applicability in new terminal concepts and product development life cycles are being shortened to maintain a competitive advantage.

Toward the Third Generation of Mobile Communication

The first generation of mobile phones consisted of the analog models that emerged in the early 1980s. The second generation, digital mobile phones, appeared about 10 years later, along with the first digital mobile networks (see Figure 1). During the second generation, the mobile telecommunications industry has experienced exponential growth, both in subscribers as well as in new types of value-added services. Mobile phones are rapidly becoming the preferred means of personal communication, creating the world's largest consumer electronics industry. In 1997 more than 100 million mobile phones were sold worldwide.

In the early years of the new millennium, the third generation of mobile telecommunications will enhance the use of sophisticated wireless applications. Users will be able to employ personal wireless services that can be interactive and even location based. Many companies and corporations are restructuring their business processes to be able to fully exploit the opportunities provided by the emerging new wireless data services.

Third-Generation Services

Many third-generation services are already available today, and their quality of use will improve with the introduction of the third generation: future mobile communication will most certainly be a revolution in bandwidth and an evolution of terminals in applications and services. Following are the main service areas that will be enhanced.

- ◆ **On-line mobile video conferencing.** Third-generation terminals will enable virtual work teams, even when on the move, to work on common tasks and projects. The concept of "mobile voice calls" will evolve, as multimedia capabilities, especially video, are added to the services and terminals. For example, data and images can simultaneously be shared and acted on by

¹ Excerpted from *Designing Mobile Phones and Communications at Nokia in Information Appliances and Beyond: Interaction Design for Consumer Products*, Morgan Kaufmann Publishers, San Francisco, CA, USA, December 1999, ISBN:1-55860-600-9.

users who are connected by voice or video connection, leading to more effective, versatile, and satisfying online visual communications.

◆ **Location-based information services.**

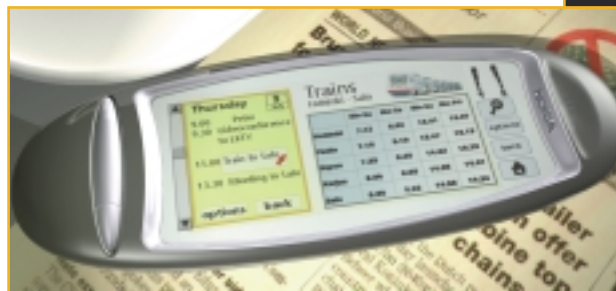
A visitor to a strange city will be able to instantly access local information, for example, video clips of films being shown at local cinemas. A tourist will get a map and historical information on a sight or landmark in front of him, directly downloaded to his third-generation mobile communication device. A commuter will be able to play a round of bridge with his friends while traveling to work. Alternatively, he will have the opportunity to enjoy his own personal newspaper.

◆ **Seamless connectivity between devices.**

The emergence of third-generation terminals is expected to be further enhanced by significant improvements in the interconnectivity between various devices. The mobile phone will act as a gateway to the outside world for other personal electronic devices, such as personal computers, personal digital assistants, and digital cameras. Some of these functions may be incorporated into the mobile phone itself, in a way similar to today's Nokia communicators. A principal enabler of this enhanced interconnectivity is the so-called Bluetooth technology² (a short-range radio link or low-power radio frequency). This technology was developed by an international consortium, of which Nokia is a founding member.

Symbian as a Platform for Usable Mobile Applications

Symbian was founded as a joint venture of Nokia, Ericsson, Motorola, and Psion. Symbian is developing a common oper-



ating system called EPOC for wireless information devices, such as smart phones and communicators. EPOC will be licensed on an equal financial basis to all interested licensees and is expected to become the standard environment for future multimedia phones and communicators.

Symbian offers an open application platform on which efficient third-party development becomes possible. This openness and free entry of independent solution providers will create competition and added value that will ultimately benefit consumers.

From the end user's point of view, the main benefit of Symbian's platform for mobile communication is that it enables the creation of consistent user-terminal interaction and core functionality across both the licensees' wireless information devices and the available applications. This will further improve and harmonize usage of the third generation of mobile communication.

Evolution of the Usage of Third-Generation Mobile Communication Nokia's Future Terminal and Interaction Visions

Nokia is heading toward the millennium with new mobile communication concepts that are based on strong innovation, creation of technological solutions, and the adoption of the principles of user-centered design. Figures 2 and 3 show two early multimedia concepts.

Conclusion

We are entering a new communication and work

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Figure 2: A future communicator concept. (left)
Figure 3: A future smart phone concept. (right)



² For more information on Bluetooth see <http://www.bluetooth.com>.



culture in which time and place are less critical and in which people are finding new, individually suitable ways of merging or separating their business and personal lives. The overall goals of work and leisure activities are not likely to change—users still need to gather and

distribute information, remember to be in certain places at certain times, and still win at golf. However, different forms of and practices in achieving the goals are likely to change, especially when more personally adaptable systems become available for consumers. 