

Chapter 1 : Historical Background of Mobile Communications

The Evolution and Future of Mobile Communication Systems



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1.1. Early Systems

1.1.1. 1921

The Detroit Police Department in 1921 implemented a radio that system allowed the patrol cars to communicate a central control point, although this system has little in common with today's sophisticated modern communications systems, it was the first mobile communications system.

1.1.2. 1939 – 1944 (World War II)

World War II proved that the mass production of VHF radios was possible, by the end of the 1940's there seems to be little standing in the way of the development of mobile communications systems.

1.1.3. 1946

By 1946 in St. Louis it became possible link a vehicle mounted mobile radio unit to a PSTN (Public Switched Telephone Network).

1.1.4. PMR & PAMR (Private Mobile Radio & Private Access Mobile Radio)

These systems were developed by during the 1950's, usually utilising vehicle mounted units. These systems are mainly used by the emergency services, public utilities, road haulage and taxi's. To start with these systems were very basic single site and single channel. However they have developed into much more complex systems, utilising multi site, multi channel, selective calling, connections PABXs/PSTN's and direct calling. (TETRA(Terrestrial Trunked Radio)).

1.1.5. TACS (Total Access Communications System)

TACS was the first real mobile communications system*. In 1985 when this system was introduced it was mainly vehicle mounted units, but later developed into mobile units. Unlike the other systems used around the world TACS used the 900 MHz band.

* In the United Kingdom

1.2. GSM (Global System for Mobile Communications)

The concept for GSM started in 1982 when CEPT (Conference for European Post and Telecommunications Administration) formed a committee known as Groupe Speciale Mobile. The main reason for the formation of this committee, was to create a standard for mobile communications within Europe. This would have several distinct advantages, such as the user would be able to use their phone anywhere within Europe, and any manufacturer would be able to produce any part of the overall system. When conceived GSM was not envisaged as being a global standard.

In 1990 the design development of GSM was frozen into a set of standards known as the "GSM Specifications".

1.2.1. GSM Phase 1

The standardisation of GSM900 was completed in 1990 and of DCS1800 in 1991. These standards are designated as GSM Phase 1, they include all the central requirements for a digital cellular network. Speech transmission (Full Rate Speech) is of central importance. Data transfer is defined with rates of 0.3 up to 9.6 kbit/s. only a few basic Supplementary Services (call forwarding and call barring) are included.

1.2.2. GSM Phase 2

The standardisation of Phase 2 was completed in 1995, the main topics were Supplementary Services comparable with those of a fixed network ISDN (Integrated Services Digital Network). Furthermore, technical enhancements, e.g. Half Rate Speech, were defined. Of great importance was the decision to enable downward compatibility to the previous phases for all future GSM phases.

1.2.3. GSM Phase 2.5

GSM Phase 2.5 is characterised by a smoother transition as opposed to the previous phase changes. No complete revision of the GSM standard will be carried out but single topics will be handled separately. The standard is being updated in Annual Releases since 1996. The current topics concern new Supplementary Services, IN applications, services for specific user groups and enabling data transmission with high data rates.

1.3. GSM Evolutionary Concepts

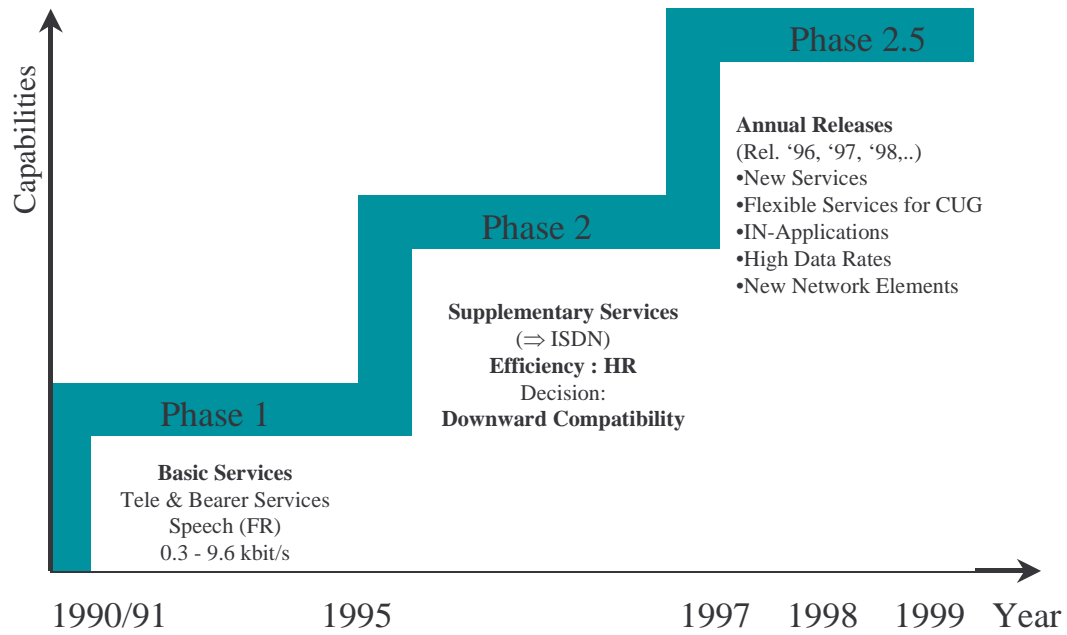


Figure 1 GSM Evolutionary Concepts

(Adapted from Ericsson LZU 108 879)