

**THE INTRODUCTION OF DIGITAL TV IN GERMANY**  
THE FEDERAL GOVERNMENT'S INITIATIVE ON DIGITAL BROADCASTING

by

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**A. Introduction**

Everybody has to be aware that digitalisation of broadcasting is a world-wide trend. Digitalisation of broadcasting is a prerequisite of the convergence of telecommunications, information technology and broadcasting because convergence of this three domains require a unique signal structure, and this structure is digital. Nobody must stand beside this process. That would cause great damage to the economy of a country.

Band on the bad experiences from the MAC-disaster and very good dues from the DVB-project we started in Germany an Initiative on Digital Broadcasting including sound and TV broadcasting and covering the three distribution platform of satellite, cable and terrestrial transmission.

The starting position in Germany is quite different from that in other big countries . Nearly 90 % of the households has already in the analogue world access to satellite and cable broadcasting. Only 10 % receive broadcasting programs exclusively via terrestrial distribution paths with a decreasing tendency. We have also to consider that Free-TV has a great tradition in Germany and dominates the market. Pay-TV is for the time being established only to a small extend.

For this reason, the Federal Cabinet decided on 17 December 1997 to commission the Federal Ministry of Economics (as the legal successor to the Federal Ministry for Posts and Telecommunications) to work together with the Federal Ministries of the Interior, of Justice, of Finance, of Defence and of Education and Science, Research and Technology on creating a platform on "Digital Broadcasting" with the other parties involved (Länder, programme/service providers, network operators, industry, trade, crafts and consumers) in order to draft a strategy proposal for the transition to digital broadcasting, if possible by 1 June 1998.

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\* Federal Ministry of Economics, Berlin. For the Initiative's website, see [http://www.bmwi.de/infomaterial/dr\\_bericht.html](http://www.bmwi.de/infomaterial/dr_bericht.html).

## B. The first steps

Following this, the Federal Ministry of Economics invited all the relevant parties to a constituent assembly on 11 February 1998 and established a working group involving representatives of the federal ministries, the Länder, the network operators, the programme/service providers, the consumers, trade, crafts and the equipment industry, which produced the following results:

- All parties are convinced that the **digitalisation of broadcasting** is of outstanding importance in economic and cultural terms and - coordinated at European level - should take place **as quickly as possible**.
- The varying use made of transmission paths for radio and television in Germany necessitates **different scenarios for the transition** from analogue to digital transmission.
- Against this background, a **timeframe** for the transition from analogue to digital television and radio transmissions was established as a common objective, with separate arrangements for terrestrial, cable and satellite broadcasts, and all parties will work together to realise this timeframe. All members of the Initiative will support a faster market-led development.
  - For **digital terrestrial television**, it was decided that work on building up digital terrestrial TV transmitters should start at the beginning of 2000 and that TV programmes should be available at an early stage with a view to establishing normal operations. No new, analogue terrestrial TV transmission networks should then be set up and no existing ones should be expanded further, unless this is necessary for optimisation purposes as part of the con-version. The digitalisation of terrestrial TV networks should be completed in 2010; analogue TV transmissions should be phased out by then.
  - For **digital television via cable and satellite**, it was decided that all parties should successively offer digital TV and other innovative services by 2010, with the aim of achieving market penetration of terminal equipment which can also receive digitally of > 95 % in each coverage area, and thereby of substituting the market for analogue broadcasting and other services. The digitalisation of satellite transmission will take place in a "simulcast phase" (i.e. simultaneous analogue and digital transmission) coordinated with the programme providers.
  - For **digital radio**, it was decided that DAB (Digital Audio Broadcasting Standard) is the digital terrestrial radio system of the future. Normal DAB operations should commence in autumn 1998, at the latest in spring 1999, initially as a supplementary service in addition to analogue VHF radio. A market-led expansion of DAB will require further transmission capacities in the short to medium term; in addition, it is assumed that there will be an increase in multimedia services transmitted by DAB.

The transition to digital radio must take place "gently" and be oriented to European developments (in initial planning by the European Conference of Postal and Telecommunications Administrations (CEPT), 2015 is named as the year for the phasing out of the relevant analogue

transmissions). Digital radio transmissions via satellite and cable are not linked to the introduction of digital TV transmissions. It should also be possible for the digital radio programmes transmitted by terrestrial broadcasters and by satellite to be fed digitally into the cable system.

- The deadlines given here are to be **reviewed in 2003** in the light of the actual national and international developments, and particularly of the likely developments in equipment. In particular, the review shall examine what date can be established for the phasing out of analogue radio transmissions.
- The full digitalisation of the frequencies so far used for analogue terrestrial broadcasting will make possible a three or four-fold **increase in capacity**. This means that, in line with the table of frequency allocations, broadcasting can be provided with the capacities it needs both to continue the services from the "analogue era" and to develop its programmes and transmission technology; in addition, frequency resources for new, and especially for multimedia, services can be developed. However, it is not possible at present to ascertain the quantitative distribution of these two frequency ranges.

In order to ensure that the timeframe given above can be adhered to, a number of preconditions need to be put in place. A lot of this work, which will be very time-consuming, still remains to be done. It is becoming apparent that this work can only arrive at practicable solutions if the various parties work together, and particularly if there is a consensus between the Federal Government and the Länder.

### C. Evaluation of the results

With the report from the working group, the "Digital Broadcasting" Initiative has provided a signal which is of great significance in terms of telecommunications, economic and media policy.

In general terms, the digitalisation of broadcasting will create the preconditions needed for the integration of information, communications and broadcasting technologies. It thereby opens up markets for new digital services and a variety of innovative processes. In addition, it offers an economically favourable way to overcome a current lack of frequency availability for broadcasting. In specific terms, the digitalisation of broadcasting will provide the infrastructure for the marketing of new digital products and services, both in traditional broadcasting and in the field of new multimedia services.

The faster the digitalisation takes place, the greater the international market opportunities will be for these services. The digitalisation of broadcasting will thus help to make Germany more competitive and to avoid competitive disadvantages for German companies and service providers. It will also help to consolidate and extend Europe's leadership in this field. The possibility to develop markets using multimedia services in future will foster growth and employment in this highly dynamic sector.

Furthermore, the increase in capacity following digitalisation means that the policy on communications and media of the future will not be as dominated by a battle to obtain scarce

resources as has been the case. This will remove the need for the state to decide on the selection of services to be offered to the consumer and the market. New opportunities to grant and utilise resources will emerge; this will also substantially reduce the need for government regulation, apart from certain rules, e.g. on protection of young people and on data protection.

The additional transmission capacities released by the digitalisation of broadcasting should, whilst preserving the interests of broadcasting, be open to competition from all electronic services and be awarded without discrimination.

Given the current level of technology and market development, a reliable and verifiable assessment of the capacity requirements of multimedia services in terms of time, quality and quantity can only be made to a limited extent; at the same time, the way the market is developing, e.g. in the field of Internet use, shows that there is substantial potential for innovation here and that further rapid growth can be expected as the availability of corresponding services increases and the costs for the user diminish.

Against this background, the timeframe developed by the working group for the transition of the existing, analogue broadcasting system into a digital one sets an important political signal and provides the necessary certainty so that all sides, and particularly business and consumers, are able to plan. This timeframe also defines the necessary work on coordination at international (and particularly European) level as a precondition for the international use of the new innovative services. In the view of the Federal Government, however, the timeframe will basically be determined by the market and the transition may happen more quickly. The Federal Government aims at free market access for programme and service providers and for network operators.

#### **D. Further action**

The results achieved so far, and particularly the timeframe, represent a first important step; further steps must follow so that the results can be realised in practice:

- For a continuing targeted approach it is necessary for the decision-making bodies of the various parties to base their future planning on the results - and particularly on the timeframe for transition.
- If the timeframe is to be adhered to, the following action (inter alia) is also necessary:
  - a **survey of current and future needs** of broadcasting, media and teleservices, and the frequency bands required (where this has not yet occurred);
  - the **development of specific transition scenarios**, so that the relevant plans for the switchover can be realised;
  - the **assignment of frequencies for DAB** in the envisaged timeframe (where the relevant preconditions permit);
  - the **assignment of frequencies for analogue services** only in accordance with the stipulations of the report;

- an **immediate start on the introduction of digital systems** (DAB and DVB) - in line with the timeframe - and the provision of attractive programmes and services at market-based, user-friendly conditions, in order thereby to initiate and foster the transition; the production and marketing of digital terminal equipment - and, during the transition period, multi-standard equipment for the reception of digital and analogue signals - in sufficient quantities and at market-led conditions;
- the provision of **open distribution platforms** making it possible for programme and service providers to distribute their services on a non-discriminatory and market-led basis; the provision of information for the consumer about the added value of the new services and equipment via public-relations work;
- in 2003, the **review of the actual international development** of the timeframe stipulated for the phasing out of analogue TV transmissions and the setting of a deadline for the phasing out of analogue radio.

### **E. The second phase**

In order to achieve this timeframe and to tackle the other outstanding tasks listed above the second phase of the Initiative started early in 1999. A new and enhanced structure with a Steering board and the five Working groups

- Capacity,
- Scenarios,
- Market development,
- Legal aspects,
- International activities.

have been established. The Groups made good progress. It is planned to provide a "**Startscenario 2000**" by the middle of next year and to present this Startscenario during the EXPO 2000 in Hanover in October 2000. Elements of this Startscenario will be

- a service concept,
- a terminal concept,
- a marketing concept,
- a financing concept,
- a legal concept

### **F. Revision of the Stockholm Plan**

International use of television frequencies is governed by the updated Stockholm Plan of 1961.

The Stockholm Plan is based on a lozenge shaped lattice network. Stations with the same television channels are located at the angles of a pattern of equilateral lozenges. Distances between the co-channel locations are between 200 and 250 km so as to keep interference at a minimum. Further channels of the television frequency spectrum are distributed evenly in the lozenge lattice network and thus cover the entire area. If the channel at the angles of the lozenges is to be re-used in order to increase spectrum efficiency, this is only possible to a limited extent. The best location would be one at the largest distance from the lozenge angles. It would be in the gravity centre of one of the equilateral triangles which are obtained by dividing a lozenge along the shorter diagonal. The permissible power of the fictitious new station must be significantly lower than that of the station at the angles so as to avoid interference to transmissions from the original stations at the angles. The coverage area of such a new station would therefore only comprise some square kilometres, in other words would be much smaller than that of the stations covered by the original Stockholm Plan. Power that can be co-ordinated successfully would even be lower at other locations within the lozenge.

Enlargement of the coverage area is not possible if the original stations are to remain protected, i.e. if it is to be avoided that their coverage area is reduced by interference from the new stations.

This, in particular, would rule out the use of a single channel at every location within the lozenge as is required in a single-frequency network. This would necessitate clearance of an individual channel in a larger area covering several lozenges.

As country borders usually run through planning lozenges, channels would accordingly have to be cleared also in other countries. DVB-T coverage (i.e. separate single-frequency networks for every region) would require clearance of about 7 to 8 channels throughout Europe. This is no longer possible at bilateral or multilateral level. On the one hand, analogue broadcasting via these channels will have to be phased out completely by a certain date and on the other digital transmissions will have to be adjusted to single-frequency technology at the same time.

During the transition from analogue to digital television, countries will largely use individual frequencies from the updated Stockholm Plan for digital transmission. The 1997 Chester Agreement lays down rules governing the transition from analogue to digital broadcasting. As this agreement contains only planning principles and co-ordination criteria but no new frequency assignments, use of channels for single-frequency networks must be agreed on in a further conference, entitled Revision of the Stockholm Plan. Provided that this conference will replace the entire spectrum used today by television broadcasting, 5 to 6 coverages per country or region would be possible.

However, it is unlikely that the transition to single-frequency networks can be achieved within a short period of time. Even after the revision of the Stockholm Plan transition must be assumed to take another 5 to 10 years. During the transition phase it will therefore not be possible to use single-frequency networks covering large areas. Several countries plan to provide the service only for fixed reception. Transition to portable receivers with a more robust transmission mode and higher transmission power for reception in buildings as well as to single-frequency networks with frequency restrictions means to overcome additional impediments in

these countries. For financial reasons alone, therefore, the transition will rather be a long-term process.

In Germany there already is a much larger variety of programmes broadcast via satellite and cable on the basis of analogue technology than via terrestrial broadcasting. This is not going to change in the wake of the transition to digital technology, and this will largely be the reason for a declining acceptance of terrestrial services. But it is to be expected that the expansion of terrestrial broadcasting via digital transmission and through new services will cause acceptance to rise again. The fact that external antennas are no longer required for portable reception at home and its suitability for quasi-mobile reception may even be the decisive advantage that terrestrial transmission of television signals has compared to cable and satellite services.

It is non unlikely that acceptance of stationary reception via directive antenna will clearly diminish in those countries that at the present time have a high percentage of terrestrial broadcasting and introduce DVB-T only for fixed reception. But there, too, the existing antennas will have to be replaced some day so that portable reception at home without a fixed directive antenna might in the long run be an indispensable incentive also for these countries. Satellite broadcasting may become more important there, too, and leave terrestrial broadcasting behind as far as programme variety is concerned. This would necessitate a new utilisation profile, for instance "universal portable reception", like in Germany now.

Single-frequency networks above all are the basis for achieving extensive coverage for portable reception at home in an economically efficient way with respect to the necessary transmitter power.

As mentioned above, another advantage of single-frequency networks is the greater efficiency of spectrum usage compared to conventional networks. Since frequencies are increasingly regarded as a commodity, this inevitably calls for the most efficient use of frequencies possible. In the long-term conventional networks will therefore only have a marginal chance to survive.