

# DRM — implementation issues



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Implementing a new technology around the globe is not straightforward. History provides us with few examples of a successful roll-out on day one of a global launch – with perhaps the exception of some new electronic toys. To penetrate new markets, even on a small scale, is a challenge for any organization involved in bringing a new product to market. Multiply this by the vast range of different market conditions that a new technology – with global aspirations – will face, and it becomes a serious issue.

This article talks about some of the challenges facing the launch of Digital Radio Mondiale (DRM) and the route that is now being planned to enable the implementation to be a successful one. It focuses particularly on the end listener, and the issues that will be faced by DRM in getting this new digital service to the consumer.

Radio, at least analogue radio, is probably one of the most commonly used technologies where it can be said that there is something close to a common standard. Frequency-band usage may vary in different geographical areas, channels may be used in different ways, but the underlying technology is fundamentally the same. A receiver, bought anywhere, will stand a good chance of working anywhere.

There can be few other consumer technologies around the world – with perhaps the exception of the CD and audiocassette – where it can be said that there is a degree of universality. Mobile and fixed telephony ... television distribution standards ... DVD ... (the list goes on) ... have all evolved in a market-specific way. There is no demonstrable reason why this is so – it is due mainly to the wide-ranging conditions, or drivers, applicable to a particular market.

There are of course a multitude of reasons why a particular type of technology might evolve in different ways, in different parts of the world.

At a national or regional level, the following factors will all have an impact on the take-up of a new technology:

- ⇒ the pace of technological change;
- ⇒ import or export controls;
- ⇒ market maturity;
- ⇒ wealth or personal disposable income (PDI);
- ⇒ regulation;
- ⇒ whether consumers are early adopters of new technology.

But these are not the only factors. Market conditions will also influence, or drive, the take-up of a new technology and these conditions can be quite diverse.

The challenges facing DRM are therefore significant. It is a matter which has been occupying the consortium for some months – and one where past successes, failures and the pitfalls of rolling out a new technology, play large.

## Recent new technologies — failures and successes

### *Iridium and GSM*

History is littered with examples of failed new technologies. More recently, the *Iridium* global satellite telephone system has been one of the most spectacular and costly failures. The technology was planned at a time when analogue mobile phones were taking off, and before the concept of GSM had been fully established. By the time the *Iridium* satellites had actually been launched and the first few phones sold, GSM technology had taken off – and had outstripped most predictions, prices had fallen and the technology had proven to be reliable.

A satellite technology, on the other hand, that:

- ⇒ required line-of-sight;
- ⇒ was expensive to operate ;
- ⇒ had a handset the size of the average house brick ...

... was not going to be the most attractive proposition to the consumer, who could already roam with GSM in many major towns and cities of the world.

The very people who could afford this new satellite technology were already reasonably well served with GSM. Those who weren't, were unlikely to have found the entry price to the *Iridium* system within their range. So, clearly, any new tech-

The image shows the letters 'GSM' in a large, bold, sans-serif font. The letters are primarily yellow with a blue outline. The 'G' is the largest, followed by the 'S' and then the 'M'. The letters are positioned on the right side of the page, partially overlapping the text to its left.

nology has – in marketing terms – to have a Unique Selling Point or USP, if it is to be attractive to the market. In the case of mobile telephony, the purchase price, call charges, size, weight, functionality, ease of use and ability to roam were key factors. For other new technologies, originality and something new or different may play a part in the acceptance and take-up.

## ***Digital Audio Broadcasting (DAB)***

The development of DAB in the UK offers another example of some of the key influences and challenges affecting market take-up of a new technology. There are lessons arising from the introduction of DAB in the UK which DRM can draw on, in determining its own strategy. So what are those lessons?

DAB transmissions started in the UK in September 1995 when the BBC launched its DAB service using the Eureka-147 standard. Work had been going on for some years prior to that on the development of the standard. Today, some 60% of the UK population (over 30 million people) is covered by a digital radio service.

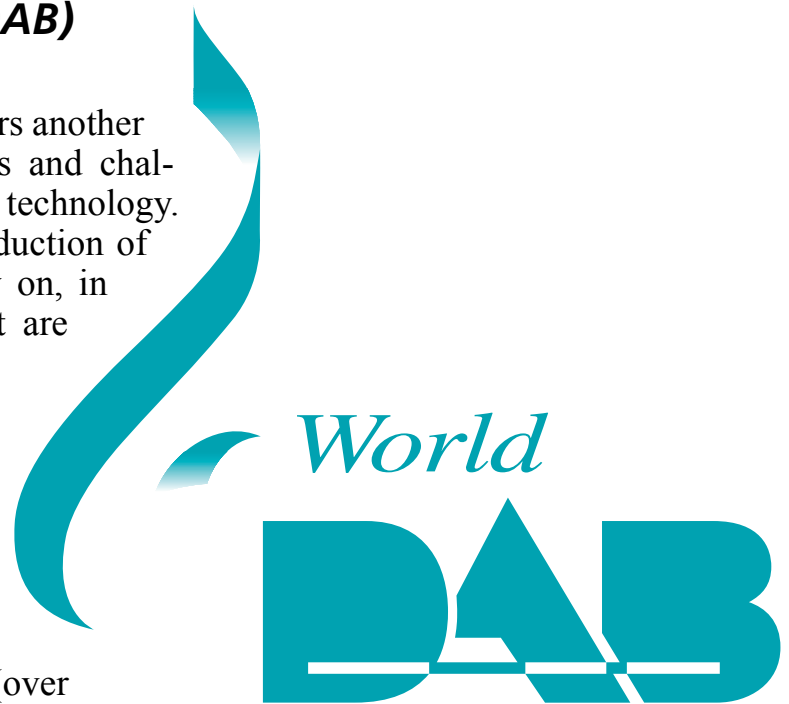
Receivers, though, were not generally available until 1999 and then at prices prohibitive to all but the most enthusiastic of listeners. Early receivers were well in excess of \$1000 – considerably more for some Hi-Fi units. Consistent reception, good stereo audio quality and ease of tuning (just some of the benefits of DAB) were insufficient to persuade the receiver industry to start volume production of new receivers – let alone low-cost ones. Ultimately they were not convinced that a digital BBC service was enough of a USP to encourage the consumer to buy a DAB receiver.

FM quality is good. DAB audio quality alone, to the average consumer, is little better. Earlier DAB sets were thus on short production runs and did not offer the wider functionality that the Eureka-147 standard could provide.

It is only recently – with the arrival of the first commercial services, some of which are not available on FM and only a few are on AM – that the increased choice available to the consumer has started to make DAB an attractive proposition in the UK.

So even in a market where many of the factors exist <sup>1</sup>, the actual sales have been slow.

1. The UK is a mature media market with a high PDI (personal disposable income) and a substantial number of early adopters of new technology. In fact, it had one of the faster growth rates for mobile phones in the world, which might suggest a quick take-up of another new technology.



Increased choice from the provision of new specialist channels has given Digital Audio Broadcasting a USP that had previously been missing. There are other signs that the technology might shortly see a period of growth. The broadcast industry is seeking to “talk up” the market. Heavy promotion of the technology is now taking place on many of the analogue, or sister, stations of the new digital service – highlighting the choice of channels now available and the audio quality of the digital service. Receivers are being given away as competition prizes; some broadcasters are offering discounted receivers and others are believed to be exploring low-price receivers and branded radios as a means of stimulating the market.

A national UK newspaper article <sup>2</sup> in early February of this year noted that there ...

*“... are barely 30,000 digital receivers in circulation and the number is not yet catching the eye of national advertisers”.*

Seen in the context of an estimated 60 million-plus traditional receivers – it is small. The article also suggests that ...

*“... AM analogue is declining in value faster than the potential increase in the value of digital”.*

Some of these issues are a challenge on a national scale, let alone an international one – which is what DRM is facing with a technology that transcends national boundaries.

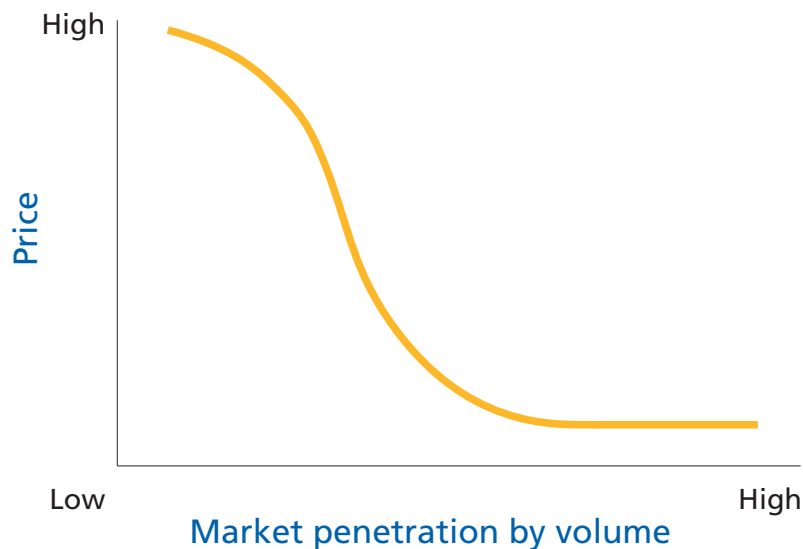
## **WorldSpace**

More recently, the new *WorldSpace* direct-to-listener digital satellite service has faced its own challenges. *Afristar*, the first of three satellites, offers up to 96 channels of audio on each of three beams, from a geo-stationary position which provides coverage of Africa, the Middle East and parts of Europe and beyond. The channels can be bundled together to provide stereo or CD-quality sound, depending on the number of channels used. A second satellite has now been added, covering much of South and East Asia.

New receivers – some of which only work with the new technology (others additionally include traditional analogue tuners) – have been available to consumers for about a year. The initial pricing of circa \$300, though cheaper than early DAB receivers in the UK, is believed to have seen slow sales. It is true of most new technologies. Although the original entry price for *WorldSpace* receivers was cheaper than early DAB receivers, it needs to be seen in the context of the level of disposable income in many of the markets served by this new satellite service – relative to the UK. The price, though, is coming down rapidly.

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2. Financial Times – 2<sup>nd</sup> Feb 2001, Companies & Finance – Media.



**Figure 1**  
The classic volume-price curve.

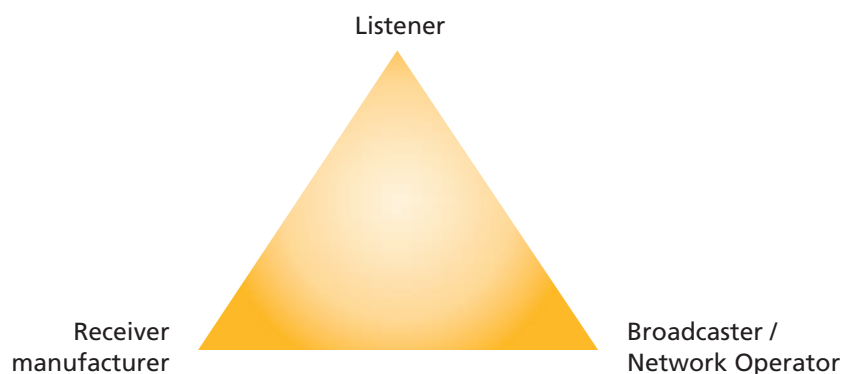
The preceding examples demonstrate that there are many factors which can influence the take-up of new technologies. One thing is clear, most will go through the volume-price curve (*Fig. 1*) whereby the price only really makes mass-market penetration possible at the point where it falls to a level that is consistent with the average PDI of the consumer.

## A brand new technology — DRM

So we know from the introduction of other new technologies that market entry is going to be governed by a number of drivers. In the case of DRM, there is a range of conditions that are going to have to be satisfied, and several key drivers that are likely to influence the take-up.

There are, though, three key relationships in the likely success of the roll-out of DRM technology, as set out in *Fig. 2*. These are the listener, the broadcaster / network operator and the receiver manufacturer.

This three-way relationship is one of the most important and will need to be effectively managed if DRM is going to be successful.



**Figure 2**  
The three key relationships for DRM to succeed.

The *listener* will need (i) to be persuaded that DRM has something to offer (a clear USP) and (ii) to have access to receivers at a price which is appropriate to the market.

The *broadcaster* and *network operator* will want reassurance that receivers will be available, if they are going to convert or build the transmitters and make the programmes available.

Finally, the *receiver manufacturer* will wish to see a number of broadcasters providing sufficient content to create the market potential.

Getting this tri-partite relationship right is the first challenge. Behind this, though, are other issues that need to be addressed – drivers that will impact on the roll-out that the industry is going to have to consider (*Table 1*). These three interdependencies need to be cracked first, if the implementation is going to be completed in an appropriate time-scale. But what is appropriate and who else does it involve?

**Table 1**  
**Implementation dependencies.**

Player	Dependency	Key Drivers
<b>Broadcaster / Network Operator</b>	Receiver availability Listener market	Spectrum availability Regulatory agreement Transmitter availability
<b>Receiver Manufacturer</b>	Content availability Listener market	Low IPR cost Market size Broadcaster "sign up" Chipset availability
<b>Listener</b>	Receiver availability Content availability	Need for information Receiver cost Clear USP

For the broadcasters and network operators to transmit the programmes, transmitters and transmitter conversion kits will have to be available from the manufacturing sector.

Fortunately, the *transmitter* manufacturers within DRM are actively engaged in the development of the system, and some are heavily involved in the field trials programme. It is also an industry that is more geared to short production runs, making it more responsive to demand as DRM starts to go live.

Similarly, for the *receiver* industry to start volume production, chipsets must be available. A number of DRM members are already looking at how this part of the development can be accelerated, to minimize the time to market. It is a reflection of the

overall impetus within the organization to get the technology to the market as quickly as possible.

These two aspects in the evolution of the market proposition are not dealt with in detail here. If the relationship in the triangle shown in *Fig. 2* can be resolved, it is reasonable to assume that suppliers to the industry – the chipset and transmitter manufacturers – will be sufficiently geared up.

## Establishing the timetable

There are already clear signs that existing AM technologies below 30 MHz (transmitting in the long-, medium- and short-wave bands) are in decline. It is partly the reason that the “value” of AM broadcasters is going down, as noted above. Whilst new players are entering the market, the competition with FM stations (offering higher quality audio) is leading to the erosion of traditional AM markets.



DRM set itself the target of having (i) the system description ready by the end of 2000 for submission to the ITU and (ii) the final regulatory agreement, and approval of the standard for the technical “on air signal”, ready by the end of 2001. The aim is to have receivers available in the market place by the end of 2002 / early 2003. Many observers, and certainly DRM members involved in the development of the technology, believe that if it takes longer than this before the technology starts to become available, the erosion of AM audiences will make it more difficult to persuade an increasingly demanding listener to make the switch to the DRM digital platform.

An appropriate time-scale in these terms is felt to be in the region of two to five years. This might not sound very long, but then it needs to be remembered that it was only in the latter part of 1998 that DRM was formally constituted as a consortium, the technical work groups having started earlier that year. In just under two years, the system has gone from idea to reality. The system has been successfully demonstrated recently, with the completion of an extensive set of field trials. These were carried out from a number of different locations around the world – over distances of a few hundred to several thousand kilometres.

The technology works and it has delivered audio quality comparable to that of a mono FM signal, without the usual AM signal characteristics of fading, noise and interference. It is therefore not inconceivable that the DRM timetable will be delivered.

So, if meeting the timescale is not an issue, how are the other dependencies going to be cracked.

One of the advantages DRM has is that, for current AM listeners, there is a distinct and clear improvement in the quality of the audio and reception quality over existing AM



listening. It is DRM's single most valuable USP. Results from the field tests have proven that the DRM standard will be able to compete with the FM channels, which are starting to eat into the AM listener numbers.

For the broadcaster there are distinct advantages. The wide-area coverage with an FM-like signal – delivered from a single transmitter (at lower cost), rather than via a network of FM transmitters – brings benefits in terms of both investment funding and operating revenue. For the international broadcasters, who often don't have access to local FM frequencies, it brings the ability to compete in terms of quality – which has been an increasing challenge as countries deregulate, and FM stations expand. So, with such a set of clear advantages, implementation of DRM should be easy. However, DRM is fully aware that it will need a strong push to bring it to market. The efforts of a number of groups within the consortium are now focussed on making it a reality.

The length of time it took for DAB receivers to reach the market in the UK was a major hurdle. In the case of DRM, if lead times of twelve to eighteen months for the development and manufacture of receivers – after completion of the chipset – cannot be improved, then there is a risk that momentum will be lost. The only way of overcoming this is for the key players (broadcasters, network operators and receiver manufacturers) to enter into a clear commitment to start broadcasts in agreed markets on an agreed date. This commitment will need to be defined soon, given the development times involved, and is being addressed within DRM at the moment. A marketing plan will then be developed which sets out how the broadcast industry, the retail sector and ultimately the consumer are going to be engaged over the next two years.

## Getting the price right

Marketing and promotion of the DRM standard, prior to launch, will focus on attracting as many existing industry players as possible. This will help to establish the critical mass that will enable “low-cost receivers” to become available quickly.

The receiver price which DRM has been aiming for is a \$25 premium over the price of existing receivers. The longer it takes for the cost to come down to this level, the harder it will be to establish the mass market so critical to the success of DRM. Organizations within DRM are looking at what they can do to realize this pricing ambition.



A group which was set up to establish the patent pool and IPR structure is working with industry specialists to try and set a realistic and competitive model for patents associated with the standard. Mindful that national and international AM broadcasters are transmitting to large markets with mass audiences, there is an opportunity to adopt a different structure to the



patent pool, that avoids front-loading the IPR returns. The size of the market offers the potential for significant volume sales from the implementation of the technology, and attractive returns for the IPR owners. The aim is to set a structure that doesn't push the entry price of receivers to unreasonable levels. The bulk of the potential consumers who are likely to benefit from, and will use, this new technology are not going to be the early adopters with high disposable incomes. The goal is to have a new paradigm for the operation of the patent pool – with long-term, not short-term, returns.

## Regulation & migration

The AM bands – regulated as they are at both international and national level – need specific consideration in terms of spectrum usage. This is being considered in terms of the regulatory context as well as the migration from analogue to digital technologies.

Bridging the gap between the old and new, in terms of the available spectrum, is a particular challenge and needs to resolve two distinct issues: firstly, the allocation of spectrum and, secondly, how it is used. Having sufficient spectrum available for the new digital services, as well as sustaining the existing analogue use, will be a major consideration. In an ideal world, an administration would simply set aside an unused segment of the frequency bands for the new service. On a global scale this is not so easy. The spectrum is already heavily used and international regulation requires careful discussion and agreement before changes, which are often incremental, are made.

Simulcasting, which some DRM members are particularly keen to pursue, may provide part of the solution. There are, though, a number who question the wisdom of splitting an already narrow 9 kHz or 10 kHz channel and effectively halving the audio quality of both the analogue and digital services. The DRM standard is, however, an extremely flexible technology and can be operated with different channel widths – assuming that these can be made available. Work is being done to look at simulcasting in an existing channel – but this has not been proven in field trials of the DRM standard.

### Abbreviations

<b>AM</b>	Amplitude modulation	<b>GSM</b>	Global system for mobile communications
<b>CD</b>	Compact disc	<b>IPR</b>	Intellectual property rights
<b>DAB</b>	Digital Audio Broadcasting	<b>ITU</b>	International Telecommunication Union
<b>DRM</b>	Digital Radio Mondiale	<b>PDI</b>	Personal disposable income
<b>DVD</b>	Digital versatile disc	<b>USP</b>	Unique selling point
<b>FM</b>	Frequency modulation		

Longer term, the migration to digital and the ceasing of analogue services will provide a challenge for the international regulatory arena. It will be many years before analogue services can be “switched off”, providing a series of issues for those involved in international spectrum-allocation meetings.

## Choosing the right market

Getting the right receiver price, and signing up industry players within an appropriate regulatory and migration framework, assumes that the choice of where the service is going to be launched has been resolved. This too is an area that DRM is addressing, and is being looked at from a number of angles.

It is one of the single most important pieces of work now underway within DRM and will have a major impact on the ultimate success of the DRM roll-out.

There is a consensus emerging within DRM that Europe is likely to be one of the first launch markets for the new standard. It is a region that has many of the characteristics – some of which have been referred to earlier in this article – that make DRM attractive both strategically and commercially. There are a number of broadcasters with AM capacity, but without access to FM, who are keen to provide a higher quality service for their listeners. It is a market that has reasonable levels of PDI and the sort of “early adopters” who may be ready to try a new technology.

It is also a market where wide-area coverage offers an opportunity to “talk” to the whole of Europe, thus providing seamless high-quality coverage from one country to another.

However, Europe is not likely to be the only launch market. DRM is working with its members in different parts of the world to identify other areas which may wish to participate in the early implementation of this exciting new technology – a technology that has the potential to become another truly global standard, whereby a receiver bought anywhere will work anywhere.

Further information including details of how to join the consortium can be obtained from the DRM Website <http://www.drm.org>



**Mike Cronk** joined BBC World Service in 1982 and worked in a number of areas, including studios and IT, in business management roles. He was appointed to his current post – Controller of Distribution & Technology – in November 2000 and, prior to that, was responsible for Transmission Services, having managed the privatization of the World Service transmission business in 1997.

Since 1998, Mr Cronk has led the BBC’s involvement with DRM and represents the BBC on the DRM Steering Board. Until January of this year, he chaired the Commercial Committee of DRM.

Alternatively, you can write to the DRM Project Office at the address below.

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