

In March, Senator Richard Alston, Minister for Communications, the Information Economy and the Arts, announced the timetable for the introduction of digital broadcasting. On 8 April 1998 the Government introduced into Parliament the Television Broadcasting Services (Digital Conversion) Bill 1998 and the Datacasting Charge (Imposition) Bill 1998, in order to facilitate the introduction of digital television.

Here the Minister answers some of the questions such a momentous change inevitably raises.

What is digital broadcasting?

Q A

Television

What is the difference between digital and analog television?

Analog and digital television differ in the way the information is carried from the source to the receiver. In simple terms, in analog broadcasting the signal is in the form of a continuous wave form whereas a digital signal is in the form of discrete bits of information.

The advantages of digital lie in the possibility of manipulating the bits of information in certain ways, so that information can be processed by both sender and receiver, can be compressed into smaller packages (using the available carrying capacity more efficiently) and the desired information can be more easily separated from the background noise and interference (resulting in clearer reception).

The ability to compress the digital data stream means that digital transmission is far more efficient in its use of spectrum than analog transmission.

What are the benefits to consumers?

Digital television allows the broadcast of widescreen, cinema quality programs with surround sound. It can also provide multiple information streams allowing the user access to, say, interactive television.

From a technical point of view, it provides clearer, sharper pictures without the interference and ghosting that currently affect many viewers in built-up areas or hilly terrain.

Will everyone who gets a signal now be able to receive the digital signal?

In analog broadcasting, there is a steady decline in reception quality the further the television set is from the broadcast tower. People towards the edge of the reception area will get relatively poor quality television, but there is no clear cut off point.

In digital broadcasting, people throughout the reception area will get good quality reception

which will change very little with distance from the broadcast tower. However, there is a point at which reception fails, beyond which people get no reception at all.

Broadcasters will therefore be required to submit to, and comply with, implementation plans provided to the ABA—including a timetable for digital commencement and a commitment to maintaining viewer coverage.

Why are existing free-to-air broadcasters being provided with an additional 7 MHz of spectrum with no upfront costs?

Existing free-to-air television broadcasters will be loaned spectrum on condition that they use the spectrum to transmit a minimum level of high definition television (HDTV), continue to simulcast their programs on their analog channels and return loaned spectrum at the end of the simulcast period. They will continue to pay the Government licence fees for their analog transmission based on their annual earnings. In 1996–97 this amounted to around \$190 million.

The Government's decision to loan spectrum to the existing broadcasters for a simulcast period recognises that they will be required to make a very significant investment in the conversion to digital broadcasting (the Federation of Australian Commercial Television Stations estimates around \$500 million) in the face of uncertain consumer demand and advertising revenue, and at a time when they face increasing competition for viewer attention from new media such as the Internet. The broadcasters will also have to maintain separate infrastructure for both digital and analog transmission during the simulcast period.

While digital technologies allow good quality television broadcasts using smaller bands, they would not allow HDTV. It is also questionable how commercially attractive the remaining small bands of spectrum would be to other players.



How can broadcasters use the 7MHz?

The 7 MHz of spectrum can be thought of as a pipe which can carry a certain amount of data (the television signal). Digital technology allows the broadcaster to use the pipe in several different ways. For example, it can be all used to carry a single large volume of one kind of data, or it can be subdivided into several smaller pipes each carrying a smaller volume of a different kind of data.

Different types of programming will result in different volumes of data: for example a high action sports program will use a larger volume of data than a 'talking heads' program. The broadcaster will need the whole pipe to provide HDTV as it needs a large continuous volume of information.

Free-to-air broadcasters will also be allowed to provide 'enhanced programming'. This could include features such as viewer-initiated multiple views of sporting events, such as the pit-stop view and a trackside view during a motor race.

Free-to-air broadcasters may also provide other advanced information services which are linked to television programs (for example, viewer-initiated access to text-based or visual player profiles during a sports program) as well as direct terrestrial access to Internet-type services. Existing free-to-air broadcasters will be charged fees for datacasting services.

Existing broadcasters can manage the flow down the pipe in a dynamic way, and will be able to switch from HDTV, to SDTV with program enhancements, and back again as needed.

Why will existing free-to-air broadcasters be prohibited from providing multi-channel or pay TV services?

These services are not part of their core business, and allowing them would put at substantial risk the viability of the fledgling subscription television industry.

The Government will review this decision in 2005, to determine whether multichannelling and pay TV should be allowed by commercial free-to-air broadcasters having regard to developments in the pay TV industry.

How much spectrum will be available for new players?

The planning of the broadcasting spectrum currently provides for twelve 7 MHz channels (channels 0-12) and two 6 MHz channels (channels 5A and 9A) in the VHF bands, and forty two 7 MHz channels (channels 28-69) in the UHF bands.

The use of channels varies from area to area, and must be planned carefully to minimise interference between signals. Analog television

signals cannot be placed in adjacent channels because of interference. The vacant 'protecting' channels are known as guardbands.

In any broadcast area, each of the broadcasters has a main transmission site operating in a particular channel. These are usually augmented by a number of secondary, lower powered transmitters, called translators, designed to extend the transmission or fill in poor reception areas. Translators operate on different bands from the main transmission.

Thus, in a large urban area such as Sydney, with five channels and several translators, a large proportion of the available spectrum is used or unavailable due to interference.

However, an important characteristic of digital television is that signals can be transmitted in the guardbands without interfering excessively with the analog signals in adjacent channels. Digital signals can also be made to fit into the 6 MHz VHF channels which are not wide enough for analog broadcasts.

So there is spare capacity in virtually all areas of Australia which would be available for reallocation for other users. The precise channels available will vary from area to area.

What is datacasting?

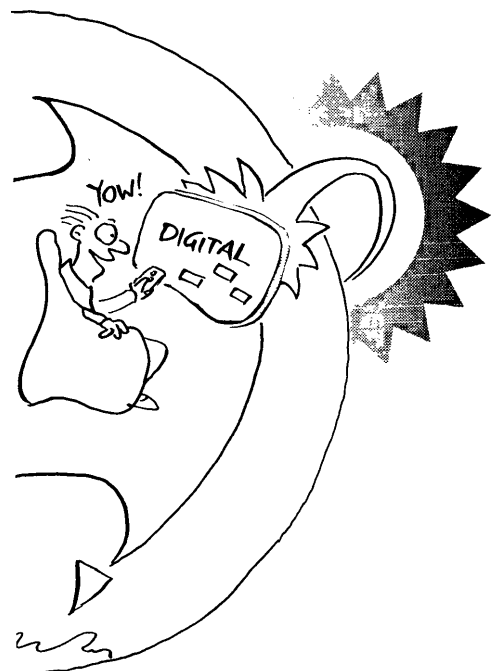
Datacasting is the transmission of data using the radiofrequency spectrum. In the context of broadcasting, there is the 'main' broadcasting signal comprising the normal television programs, and a datacasting signal providing other sorts of information, such as text, still pictures, sounds and some video.

It will be up to the industry to develop datacasting services which are attractive to consumers. The most likely services will be suites of commonly used information such as weather reports, news, stock prices and entertainment guides, which are stored in users' sets or set top boxes and updated automatically several times a day.

Also possible is the integration of Internet sites with television programming to allow users to (for example) obtain background information to a live sporting event off the Internet while viewing it.

How will new datacasting players gain access to spectrum?

A Planning and Steering Committee for digital terrestrial





Q & A

television will be established to commence the technical planning and identify broadcasting spectrum not required for digital conversion of existing free-to-air broadcasters.

Unused spectrum identified in the review will be allocated on a competitive basis for television datacasting services in time for services to commence at the same time as free-to-air digital television broadcasting.

In addition, the Australian Communications Authority (ACA) and the ABA will be required to report on the structure of, and conditions for, the allocation of spectrum not required for the digital conversion of free-to-air broadcasters (the television datacasting spectrum). A fees regime for datacasting spectrum will also be developed which ensures a level playing field between free-to-air and non free-to-air datacasting providers.

Conditions of spectrum sale will preclude existing free-to-air broadcasters from bidding for this spectrum and ensure spectrum access, free of charge, of a standard definition community television service will be ensured.

Will broadcasters need new transmission towers?

Wherever possible, free-to-air broadcasters will be able to co-locate their digital transmitters at current analog sites. This will maximise the use of existing transmission infrastructure.

An access regime will allow existing free-to-air broadcasters reasonable access to transmission facilities for the purposes of installing digital transmitters. Actual requirements for transmission will be determined by the Planning and Steering Committee.

Will there be common standards for digital receivers and set-top boxes?

The development of standards and compatible equipment is a matter for industry. However, the Planning and Steering Committee will be required to consider the implications for Australian consumers of developments in this area.

Will regional Australia receive a quality television signal?

The Government is committed to ensuring that people in regional Australia currently receiving analog television services have access to digital television services of at least equivalent coverage and quality. Digital services will be introduced

from 2001 in regional areas with all areas receiving services by January 2004.

The Government will consider whether additional support to regional broadcasters (such as licence rebates) is required when planning is complete and costs of transition to digital are known.

How much Australian programming will be available?

The current Australian content standards—applicable to analog broadcasting—will also apply to digital television broadcasting.

Will additional services be provided for deaf and hearing impaired Australians?

Broadcasters will be required to provide closed captioning for prime time viewing and for news and current affairs outside prime time. The Government considers that this requirement is reasonable given that free-to-air broadcasters are being 'loaned' free spectrum.

How will community television operate in the digital environment?

New datacasting players will be required to ensure spectrum access, free of charge, of a standard definition community television service as a condition of their licence.

The Government will also consider, in light of its other fiscal priorities, whether revenue obtained from allocation of spectrum for commercial datacasting would also enable the Government to assist community television broadcasters in meeting the upfront costs of digital conversion.

What regulatory issues need to be considered?

The Digital Television Planning and Steering Committee will:

- advise on transmission standards and compatibility requirement (including issues related to conditional access systems);
- commence detailed technical planning; and
- identify broadcasting spectrum not required for the digital conversion of the free-to-air broadcasters.

Before the introduction of digital television, the Government will review:

- the kinds of datacasting and enhanced programming (multiview) services which should be allowed;
- how legislation can be amended to reflect the growing convergence between broadcasting and other kinds of media and communications services;
- whether the national broadcasters should be





allowed to transmit multi-channel programming which is non-commercial and in line with their Charter obligations; and

- rules for governing the retransmission of free-to-air digital services on pay TV systems.

In 2005, the Government will review whether:

- new commercial free-to-air entrants should be allowed after 31 December 2008;
- commercial free-to-air broadcasters should be allowed to provide multi-channel and/or pay TV services using digital technology; and
- a simulcasting period other than eight years should be prescribed in regulations.

Radio

What are the benefits to consumers of digital radio?

Digital radio can deliver CD quality sound to fixed, portable and mobile receivers. It can also provide better reception than current AM and FM radio broadcasts; and requires far less spectrum than the current analog system.

When will digital radio be introduced?

Planning will proceed on the basis that digital radio will start at the same time as digital television services. The Government will establish a Digital Radio Planning and Steering Committee to report on technical planning issues and appropriate legislative amendments.

Why will radio stations be allocated only a share of multiplex transmission facilities?

One digital radio multiplex provides five CD quality services. There are a number of advantages in broadcasters sharing the multiplex facility:

- it allows broadcasters to share costs for establishing the multiplex;
- it ensures there is sufficient spectrum available in metropolitan markets and that new entrants can be accommodated; and
- it ensures that broadcasters do not 'own' channels which they do not use.

What are the likely standards and planning processes for digital radio?

It is likely that digital radio will be introduced in Australia using the Eureka 147 system (an international standard). This is the only terrestrial digital radio system which has, to date, been demonstrated to operate effectively, and offers a range of benefits to radio audiences, including higher quality sound, and more reliable reception, than AM and FM radio broadcasts.

It is also likely that L band spectrum will be used for digital radio transmission (with some use of VHF spectrum in regional areas).

GLOSSARY

Analog broadcasting: Conventional broadcasting, in which the picture, sound and other information is transmitted as a continuous wave form.

ATSC and DVB: The acronyms for the US and European formal standards for digital television. ATSC = Advanced Television Systems Committee (USA). DVB = Digital Video Broadcasting (Europe).

Compression: A process whereby the digital signal is 'squashed' to fit a particular transmission capacity, by various mathematical processes.

Datacasting: An imprecise expression to cover the range of possible data services which could be delivered using the available transmission capacity, but not including the main broadcasting program stream(s).

Digital: Broadcasting in which picture and other information broadcasting is converted into, and transmitted as, a series of discrete 'bits'.

High definition (HDTV): Television with approximately twice the resolution television of SDTV. Various options of lines and pixels are provided for in standards, e.g. 1080 lines by approximately 1900 pixels, aspect ratio 16:9.

Multichannel: Digital television enables a data transmission rate in excess of 20 Mbits per second using a 7 MHz channel. SDTV requires around 8 Mbits per second to achieve good picture quality, and less for low.

Enhanced quality: HDTV requires the full available program/multiview transmission rate. Thus, a broadcaster has the option of providing one channel of HDTV or three or more entirely separate channels of programming at SDTV (multichannelling) enhanced views of the same program e.g. different camera angles on an event (enhanced programming or multiview).

Radiofrequency: A discrete part of the spectrum, which is used for spectrum various radio communications.

The radiofrequency spectrum is labelled according to the frequency of the radio waves in cycles per second (Hz). The frequencies included are from 3 kHz to 300 GHz. This spectrum is planned according to internationally agreed guidelines, so that particular parts of it are reserved for particular purposes. Television is allocated spectrum in the 45–230 MHz range (VHF) and 580–820 MHz range (UHF), which in Australia is divided into 7 MHz bands. Long wavelength areas of the spectrum have different characteristics from short wavelength areas—for example, shorter wavelengths usually have a shorter transmission range for a given power. This makes them useful for different purposes.

Spectrum: A natural phenomenon comprising the continuous range of electromagnetic radiation ranging from the longest radio waves through infrared, visible light, ultra violet, X rays and gamma rays.

Standard definition (SDTV): Television with the same format and definition as the current PAL analog system i.e. 625 lines vertically; 720 dots (pixels) per line; 50 frames per second using interlaced scanning; aspect ratio (ratio of width to height of screen) 4:3.

Terrestrial: Broadcasting from towers or masts using the broadcasting radiofrequency spectrum (does not include satellite broadcasting and cable broadcasting).