



WORLD DAB Newsletter

International News and Strategic Analysis on Digital Sound Broadcasting

WorldDAB plays key role in EC policy

WorldDAB submitted its contribution to the European Commission's Green Paper on the Convergence of the Telecommunications, Media and Information Technology sectors; and the implications for regulation. The key points are summarised below

The Green Paper's emphasis on the pace of technological change and in particular on the potential of the Internet, takes too little account of how radio is used and of the technical and operational limitations of such platforms. The conversion to digital and therefore convergence is likely to be a slow process.

The European industry has already established a world lead in digital radio technology. DAB is an international standard. European companies are expected to win a significant share of the audio market over time, creating and securing many jobs.

It is essential that a mass market is now quickly developed for DAB. Standards for networks and receivers are open and generally accepted and that interconnection possibilities with other systems are established. There must also be harmonisation across the EU in matters such as licensing and spectrum allocation.

Any release of broadcasting spectrum should be subject to political decision and judged against the claims of cultural diversity and freedom of expression implicit in radio broadcasting. Sufficient capacity should be made available for the provision of data services for the mass audiences currently reached by broadcasters. New

services must make the most of Digital Radio's data capabilities given the intense competition to provide mobile data services by providers ranging from telephony to digital television.

An increased distribution capacity in all areas allowing broadcasters greater freedom to establish new programme and data services might reduce the need for regulation but regulation will continue to be important in supporting the creation of an open and fair market.

Public and private broadcasters should be offered equal opportunities, through the licensing system, to exploit the new marketplace. All broadcasters will need to invest in FM and DAB for considerable periods without return. The financial and commercial risks implicit in moving to the digital world must be recognised by licensing authorities in all Member States.

The Commission must encourage national regulatory authorities to respond positively to broadcasters' needs in managing the early stages of this radio revolution. This will reduce the risk of uncoordinated implementation of the new technology that would be to the considerable disadvantage of consumers and the audio manufacturing base in Europe.

WorldDAB supports the principle of a switch-off of analogue in approximately 10 years as an attractive argument in terms of signalling to the market that the digital era has arrived.

The establishment of open and common systems for networks and receivers must protect consumers' interests as the broadcasting industry becomes more internationalised.

Standardisation work in Europe is also

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very important, with broad and if possible global acceptance. This philosophy has underpinned the Eureka 147 programme since its inception and now drives the development of DAB applications. If, going forward, consensus cannot be reached, the EC should consider regulation of certain key technology areas in order to ensure an open and fair market throughout Europe. A divergent market is in direct conflict with the interests of consumers.

Radio should be driven by the interests of the consumer as much as by considerations of technology and the aspirations of business.

News Bytes

DAB rollout should start immediately

Members at a recent Module 1 meeting agreed that the rollout strategy for DAB should come in two phases.

Phase I should come immediately with existing technology implemented now. In addition to audio services, the present system should be able to support mature features which should warrant a risk-free implementation. These include programme types and HTML version 2.0. It is understood that the Eureka 147 project successfully resolved all major technical issues. The Module also agreed that any remaining minor technical problems should be resolved as soon as possible among the Eureka partners.

Phase II will implement next generation receiver features that have not yet been incorporated. These include navigation, conditional access (CA) and a Windows operating system such as CE. Although these features are not possible today, they should be available within two to three years.

These findings were presented to WorldDAB's Steering Board in April by Module 1 Chairman and WorldDAB Vice-President Per-Erik Selemark. Steering Board members added their comments. Quentin Howard from GWR/ Classic FM said that data and CA are essential for the commercial success of DAB in the UK and called for data services to be implemented in Phase I. The commercial radio sector accounts for 50% of listeners and they need data services to maintain this audience share and attract new listeners. He warned that other technologies would overtake DAB if it doesn't move quickly enough.

Reinhard Wartenberg from Deutsche Telekom pointed out that CA, Traffic/Travel Information (RDS or other), sensitivity in L-Band and user friendliness of receivers are crucial issues which should be resolved.

EBU Statement on the introduction of DAB and how it will complement DVB-T

The EBU Technical Department issued a statement about their aspirations for DAB and how they see DAB and DVB working together. DVB stands for Digital Video Broadcasting. It allows the broadcasting of digital television and data broadcasting across the range of delivery media. All DVB systems are based on MPEG-2 audio and video compression. DVB adds the necessary elements to bring digital broadcast services to the home through cable, satellite and terrestrial broadcast systems via the MPEG transport stream multiplex. The statement is printed below

“The EBU technical and radio programme community have strongly supported the development of digital audio broadcasting in Europe. A range of existing and exciting new DAB services are available in different parts of Europe. The stage is set for rapid growth of this important new medium.

To match the initiatives already made by broadcasters, the manufacturing community must rise to the challenge of making available DAB receivers at prices within reach of the general public. The success of DAB will now depend on the energy of the consumer electronics industry. What happens with DAB will also influence the way new technologies are approached and introduced by broadcasters in future. For DAB services to have value, affordable receivers must be available to the general public.

EBU Members have supported the development of the DVB-T system for digital terrestrial television broadcasting, which has a different purpose and different design objectives to DAB. The two systems are complementary, and will both serve different aspects of the future media landscape. Each has different strengths and both are needed. Broadcasters will offer both DAB and DVB-T services, and there will be a public demand for both types of receiver. The issue of the delivery of multimedia to mobiles is under study currently in an EBU Project Group.”

For more information about DVB, contact Martin Jacklin at the DVB Project Office
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HuMIDAB Workshop Details Announced

There will be a HuMIDAB Project Workshop held in London on June 30th. This is the third and final Workshop for this group. Subjects include hands on demonstrations of human machine interface (HMI) issues from manufacturers and broadcasters. There will also be the opportunity to learn about research methods and user responses to the complex issues of the DAB interface.

HuMIDAB stands for Human-Machine Interface for DAB Multimedia Services. The group has been working on ways to make DAB receivers as user-friendly as possible so that receiver owners can find the programme and data stream of their choice.

For a booking form or more information about the Workshop, contact:

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All change for WorldDAB Website

Following the appointment of a new Press Officer, the WorldDAB Web site will be revamped and is set to go on-line at the end of May.

Information concerning WorldDAB and DAB will be posted within 24 hours. Links will be provided to WorldDAB members' sites. Information about receivers will also be provided. There will also be an on-line versions of the last three Newsletters.

Any comments and suggestions about the Web site should be sent to:

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BBC Research shows Digital Radio's potential

With over 12 million radios sold each year and 85% of the UK population tuning into radio every week, Digital Radio has enormous potential. The BBC Digital Radio unit set about establishing some hard facts about this potential and commissioned six pieces of market research during 1997 to find out more about listeners aspirations and expectations

The research ranged from telephone interviews with 1,000 likely early adopters and the general public, to in-depth focus groups with people who had been listening to digital radios for up to a month. The aims of the BBC research were varied:

- To understand who the likely early adopters of digital radio are and their aspirations for it
- To assess the interest of the general public and understand the benefits they want from it
- Identify the key motivators to purchase and the issues surrounding pricing
- To help commercial broadcasters, manufacturers and retailers in the development of their marketing plans, through our findings

Does the public want Digital Radio?

You bet they do. 73% of the people interviewed by telephone expressed an interest or a keen interest in purchasing a Digital Radio. Interest among the key early adopter groups is even higher - an impressive 77%.

So who are the key early adopter groups?

The groups are predominately male with about half being under the age of 35. These

men are more likely than most to own one or more of the following: Surround Sound TV, DCC, mobile phone and a PC. The BBC's research shows that the first buyers of digital radio will probably fall within one of the descriptions outlined below:

- Affluent gadget enthusiast - earning £25,000+ and owning the kind of gadgets listed above
- Hi-Fi buff - having spent at least £750 on a hi-fi in the last year
- Serious Music fan - top music/hi-fi magazine readers
- Car CD Owners
- PC owner - with internet

What excites the public about Digital Radio?

The considerable benefits of digital radio are generally described as:

- CD quality sound
- more choice - more services
- no interference
- no retuning
- text, data and images

The research carried out with users of Digital Radio delved deep into the motivations for purchase of a digital radio and results show clearly that people will buy into a package of benefits and not look at each benefit individually. The BBC's research has divided the benefits into two principal packages:

- 1) Better sound quality plus many more stations
- 2) Better sound quality plus text and visuals

The results demonstrate that more stations, text and visuals will act as purchase triggers. Better sound quality will be the 'post purchase' reward. The sound quality will make us feel good about the purchase we have made.

What will people pay for a new digital radio?

All of the BBC's research points to the fact that people expect to pay a reasonable price premium.

| Item | Percentage Premium |
|---------------|---------------------------|
| DAB Car Radio | 25% |
| DAB Hi-Fi | 30% |
| Portable DAB | 60% |

Source: Research from the BMRB Early Adopter Research

The research illustrates clearly that Digital Radio has mass market appeal - the outlook is bright and we are looking forward to sets being launched at an acceptable price as the evidence is that once people see and hear the product for themselves, they will buy it and love it.















This article first appeared in the UK Digital Radio Forum newsletter.



Digital Radio Broadcast Update

| | Audio services | Data services | Progress |
|---|---|---|--|
|  Australia | Test facility operating in Canberra | | The Australian Gvt. approved services starting from January 2001 in L-Band. Existing analogue broadcasters will have access with simulcasting obligations, channel splitting options and some data services. Service planning starting in 1998 |
|  Belgium | VRT - National ensemble with 6 operational services, coded at 160-224 kbit/s | Announcements, PTY and PAD with Dynamic Label. Data services to be decided at 32 kbit/s. | VRT has 11 operational transmitters in Band III covering 70% of the population. RTBF will build a network with financial contribution from the Wallon Ministry of Equipment and Transport |
|  Canada | Private Broadcasters: 15 services in Toronto, 10 in Montreal & 5 in Vancouver 128-224 kbit/s. CBC: Toronto, Montreal & Vancouver 5 audio-services 64-224 kbit/s. | PAD is currently being defined. Dynamic Label and MOT will most likely be used. Applications for Data channels are being studied. | Toronto: 4 blocks covering 3.9 million. Montreal: 3 blocks covering 3.3 million. Vancouver: 2 blocks covering 1.7 million. All transmitters in L-Band. |
|  China | Test in Guangdong Province with 7 audio programmes in one ensemble in Foshan, Guangzhou and Zhongshan. | | 3 transmitters on 85 MHz. |
|  Denmark | DR - National ensemble with 5-8 audio services and a message channel for traffic and info. 32-256 kbit/s. | PAD with Dynamic Label, MOT. Planning announcements, PTY incl language code and DRC. Data-services in 64 kbit/s Packet Mode/MOT. Programme number. | 3 transmitters in Band III covering 25% of the population. 500 Hi-Fi DAB-receivers made by Bang & Olufsen distributed to consumers for market research. |
|  Finland | YLE - National ensemble with 4-5 audio services. 128-256 kbit/s. YLE will start a new dDAB-only talk service 3rd Q 1998. | Not decided. | 3 transmitters covering 20% of the population. During 1998 10 national and 5 regional transmitters covering 2 million national and 1.2 million regional listeners. |
|  France | 3 ensembles in Paris. Radio France 8 services. 11 commercial services: Europe Radio, RTL, BFM, Radio Classique, Mosaïque, Les Indépendants, NRJ, Chérie, Rire et Chansons, Skyrock & 95.2 Paris. | Radio France: PAD with DLS and MOT (HTML, JPEG...) including Traffic info. Europe Radio, RTL and NRJ: PAD-MOT1 with various multimedia HTML, JPEG info | TDF network: 6 transmitters in L-Band covering 10 million (17% of the population). Coverage planned in 1998 for Lyon, Toulouse, Marseille and Nantes. Sogetec network: 3 transmitters in L-Band |
|  Germany | Extensive Pilot Projects in Baden Württemberg, Bavaria, Berlin/ Brandenburg, Hessen, Nordrhein-Westfalen, Saarland, Sachsen and Thüringen with some 120 audio-services from both public and private broadcasters of which 30 are unique to DAB. | More than 50 different tests and pilot DATA services both as PAD and in a DATA channel. Several info, service and network-providers are involved in the different projects. | Bavaria and Baden Württemberg has announced operational services from July 1. Transmitters in Band III and L-BAND covering 36% of the population (30 million) |
|  Hungary | Magyar Radio on One multiplex with 3 programmes | Some data services to be included in the near future. | One transmitter in channel 13 reaches 3 million. Second transmitter coming soon |
|  India | Test transmissions in Delhi. | | Planning for satellite DAB and relay in major cities. |
|  Israel | Pilot project run by Beseq, the Israeli Telecommunications Corp. | | 2 transmitters in Band III covering 70% of the population. A third is planned. |
|  Italy | RAI - a pilot project in the Aosta Valley with 6 audio services. 64-256 kbit/s. Pilot-services via cooperation between RAI and Club DAB Italia with two ensembles in Turin & Milan will start as soon as the spectrum | | 4 transmitters in Band III in the Aosta Valley will cover 10% of the population. A new law will give DAB licence to existing FM-operators. RAI is committed by the Ministry of Posts and Telecommunication to cover 60% of the population by 1999. |
|  Japan | No decision has yet been taken by the Ministry of Posts and Telecommunications on which system to adopt. | | Several manufacturers have developed DAB-receivers for Eureka 147 |

This chart shows how DAB is progressing around the world. Information is updated monthly and is available from the Project Office

| | Audio services | DATA services | Progress |
|--|--|---|--|
|  Malaysia | Pilot project during 1998 | | Frequency allocations in Band III and L-Band in February 1998. Plans for pilot project with at least 3 transmitters in Kuala Lumpur. |
|  Mexico | Terrestrial and satellite experiments. | | L-Band. |
|  Netherlands | A single national multiplex operated by the Dutch DAB Pilot Association. 8 public and private audio services. 64-192 kbit/s. | PAD with Dynamic Label. NOZEMA datacasting with weather, news, stock exchange data. 64 kbit/s packet mode/MOT. | 3 transmitters and gapfiller in Band III covering 45% of the population. |
|  Norway | National Ensemble with 5 services from the Public Broadcaster, NRK and one service from P4, the private national broadcaster. 64-256 kbit/s. | Announcements from a message channel within the ensemble. PAD with Dynamic Label and MOT. | 4 transmitters in band III covering 35% of the population. Licensing to take place early 1998 for one national and two regional multiplexes. |
|  Poland | Polskie Radio, the Polish public broadcaster, is currently broadcasting 4 audio services. 256 kbit/s. | | 8% of the population can receive a DAB signal from one transmitter. Plans for pilot projects in southern Poland covering a further 6 million |
|  Portugal | Tests in early 1998 with 3 public channels in Lisbon. Six national channels from May 1998 | | Band III starts in Lisbon from May 1998 and the seaside from Braga to Setubal by the end of the year. Eight regional blocks in continent, 3 in Maderia, 3 in Azores in band III |
|  Singapore | Demonstrations during Asia Telecom '97 by Singapore Broadcasting Authority in association with Deutsche Telecom. | | Further trials in L-Band and VHF are planned during 1997. |
|  South Africa | DAB transmitters in Johannesburg since December 1997 by Sentech as pilot system. Two stereo audio channels. Plans for demos in 1998 | Plans for data service applications in 1998. | The South African Digital Radio Association was formed during 1996. Transmitters on band III and L-Band in Johannesburg operated by Sentech. |
|  South Korea | Tests and evaluations have been carried out. | | The Ministry of Information and Culture has announced that Eureka 147 will be adopted in South Korea over the next five years. |
|  Spain | DAB starts April 1, 1998 in Madrid, Barcelona and Valencia. | | A DAB Association has been formed from private and national broadcasters. by the end of 1998 5.8 million will be able to receive DAB |
|  Sweden | SR: A national ensemble with 5-6 audio services and a message channel for traffic and info. Regional services from SR in three regions with 5 audio services. Private regional services to be decided 1998. 32-256 kbit/s. | Announcements, PTY incl language code and PAD with Dynamic Label, MOT and DRC. Data services in 64 kbit/s in packet mode/MOT. Programme number. | 39 transmitters for the national ensemble covering 65% of the population and 11 for the regional ensembles covering 35%. All transmitters in Band 111. Teracom plans for 75% national and 45% regional coverage by mid 1998. |
|  Switzerland | Pilot Projects in Berne-Oberland, Basel and Geneva with 4 regional ensembles with in total 25 public and private audio services. 96-224 kbit/s. | Data-services within each ensemble of 24-64 kbit/s with traffic, public transport, info etc. | Berne-Oberland: 3 transmitters in Band 111 and 12 in L-Band. Basel: 12 transmitters in L Band and Geneva one in Band 111 covering in total almost 2 million. |
|  U.K. | BBC - National ensemble - up to 8 services. 64-192 kbit/s. Two London RSL Multiplexes, 1 NTL, 1 Classic/GWR together providing 11 audio services. | Announcements, PTY and PAD with Dynamic Label, MOT, DRC. Data-services from BBC with Teletext in HTML-format in 12-24 kbit/s. Private services - PAD with Dynamic Label, DRC. Classic/GWR experimenting with data channel stock prices, GPS navigation. | BBC-27 transmitters in Band 111 covering 60% of the population early 1998. NTL and Classic/GWR on restricted service licences in London area. Multiplexes in Band 111. Radio Authority will start licensing private radio multiplexes for both national and local services 1998. |
|  U.S.A. | CEMA tests found Eureka 147 to be the superior system. NAB opposes the adaption of Eureka 147 in the USA. | | FCC has recently approved two licences for satellite Digital Radio in S-Band. |

DAB collection system based on the STI standard

Hans-Jorg Nowottne from the Fraunhofer-Institut Integrierte Schaltungen and Lothar Tumpfel from Deutsche Telekom Berkomp present an overview of a DAB collection system based on the STI standard. This transfers DAB data streams from service providers to the ensemble multiplexer where the DAB ensemble data stream is generated

DAB broadcasts audio and data services in a common program block or an ensemble, so the primary requirement is the multiplexing of components from different sources, like service providers (SPs). DAB makes it possible to flexibly adapt data rates used to program contents and corresponding quality requirements. Since this takes place during the transmission process, it is important that the dynamic reconfiguration of the ensemble multiplex be handled correctly. SPs must be able to initiate reconfigurations in an independent and decentralized fashion, with the ensemble provider (EP) being responsible for checking consistency and performing reconfigurations.

Each DAB ensemble has a common control channel called the Fast Information Channel (FIC). It carries service and control information like labels or announcements in the form of Fast Information Groups (FIGs). The EP has to combine service-related FIGs provided by the SPs with self-generated, ensemble-related FIGs and insert them in the FIC when required.

Management of the collection network

These management tasks need to be accomplished in connection with the collection network:

| | |
|---------------------------------|--|
| Configuration management | Dynamic reconfiguration of the ensemble multiplex |
| Service management | Coordination of SP's, generation of the common FIC |
| Fault management | Giving an alarm in case of a fault condition like loss of signal |
| Admission and management | Specifications for resources and model, billing management: for SP's, billing for transmission capacities, enables regulatory body to check capacity utilisation |
| Security management | Support for CA (conditional access) |

What is the STI?

This is the basis for feeding DAB data streams to the ensemble multiplexer and for communications between the SPs and EPs. The Service Transport Interface (STI) standard defines data formats, network interfaces and communications procedures for the collection network. A draft standard was created by EUREKA 147 and submitted in April 1997. The corresponding ETSI standard will probably be ratified by autumn. To make its practical

application as flexible as possible, the STI has a layer structure which is comprised of a Data Part and a Control Part. Both can be transported together or separately. The Data Part structure has the same function but different origins from the Ensemble Transport. It references a 24 ms transport frame and contains all the SPs programming. The Control Part transmits control information between SPs and the EP and is not bound to a particular frame structure.

The STI data is always included in a transport stream whose frames are adapted to the physical transmission link with respect to the synchronization word and frame padding. For local connections and dedicated lines, a Network Independent Layer STI(NI) was defined. The transport stream is transmitted unchanged via one of the specified interfaces (e.g. WG1/WG2). To allow the use of telecommunications networks, a Network Adapted Layer STI(NA) is provided, which also implements the adaptation to the network protocol involved.

Structure of a DAB program collection network

The multiplex signal contains all user data of the on-air signal and is distributed via Ensemble Transport Interface (ETI) to all single-frequency network transmitters. The following essential requirements apply to the operation of the collection network:

- Autonomy of the SPs in flexible use of allocated resources
- Security of the SPs from mutual interference
- Ability to use low-cost transmission paths with ensured transmission quality
- Possibility of including non-STI devices
- Ergonomic user software; procedures automated to greatest possible degree

Deutsche Telekom's demonstrator

A prototype implementation was carried out. This required further development of available DAB equipment. Audio encoders and DAB multiplexers had to be made STI-capable, and an extensive software package for supporting processes in the collection network had to be created.

This involved accomplishing the following subtasks:

1. Development of PC-based service and ensemble controllers with software components for basic network management tasks like SP administration using SP profiles (including basic specifications for resources and identifiers)
2. STI interfaces for service and ensemble multiplexers
3. STI-compatible reconfiguration control in the ensemble multiplexer
4. FIG database in the ensemble multiplexer that the SP can directly update, including checking compatibility with individual specifications
5. Assumption of control functions from non-STI SPs on the part of the EP
6. Further support of previously used non-STI input formats by the ensemble multiplexer

A DM001 DAB multiplexer from Rohde & Schwarz was developed to support STI serves as the DAB ensemble multiplexer. Important parts of its digital signal processing (DSP) software were modified and extended to implement the STI requirements mentioned above. The Windows software of the ensemble controller was also adapted and extended to implement the management tasks. A module was also integrated for encoding FIGs.

In the demonstrator network, the SPs role is assumed by the device MAGIC STI from the company AVT in Nuremberg. An STI-compatible service multiplexer was implemented in this system. A service controller supports the management functions of the SP. It provides the necessary ease of use for independent, dynamic control of the corresponding sub-ensemble. Reconfiguration, FIG generation and transmission can now be initiated by the SP. The necessary information is exchanged with the EP via the STI control file.

The STI transmission capacity can be selected in steps of 64 Kbps up to a maximum of 1920 Kbps. Support for ISDN transmission is in development.

To demonstrate the integration of more conventional non-STI SPs, the Multimedia Data Server (MMDS) of the Fraunhofer-Institut Integrierte Schaltungen (Erlangen) is used. It can be incorporated in the STI contribution network via the front end of the ensemble multiplexer, the DM001 STI. The ensemble multiplexer takes over the STI control function here, which has not yet been implemented for this SP. Alternatively, the MMDS may also be incorporated via the MAGIC STI and its service controller.

The function of the demonstration network can be controlled through analysis of the STI data at the input of the ensemble multiplexer, or through analysis of the ETI data stream at the output of the ensemble multiplexer. This is handled by a DAB Transport Frame Decoder (TFD). It's prototype was developed by the Fraunhofer-Institut Integrierte Schaltungen in Dresden. The series production device is manufactured and marketed under the designation FD1000 by Rohde & Schwarz.

The demonstrator of the DAB collection network based on STI was developed as part of a joint project and presented for the first time at IFA'97.

Deutsche Telekom Berkom had responsibility for the project lead and for financing. Project partners were:

- AVT Audio Video Technologies GmbH, Nuremberg
- Fraunhofer-Institut Integrierte Schaltungen, Branch Office EAS Dresden
- Rohde & Schwarz GmbH & Co. KG, Munich

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List of WorldDAB Meetings in 1998

| <i>Group</i> | <i>Date</i> | <i>Location</i> |
|----------------------------------|---------------------------------------|----------------------------|
| General Assembly | 22 ~ 23 October | Stockholm |
| | 10 June | Geneva |
| | 4 September | Milan |
| | 21 October | Stockholm |
| Module1 | 28 August, 9 October | Wyvil Court, London |
| Module 2 | 25 ~ 26 May | Dusseldorf |
| Module 3 | 9 June | Geneva/Montreux |
| Module 4 | 25 ~ 26 August (13.00 on 25th) | Wyvil Court, London |
| HuMIDAB | 23 June | Stuttgart |
| European Affairs Comm. | 26 June | Brussels |
| | 29 May | Hildesheim |
| | 13 July | Wyvil Court, London |
| 4th Intl. DAB Symp.Comm. | 25 Aug | London |
| | 4 June | Singapore |
| Finance Comm. Meeting | 10 June | Montreux |
| Joint WorldDAB/Eureka Mtg | 10 June | Montreux |

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These meetings could be subject to change. If this is the case all WorldDAB contacts will be given advance notice

In the next issue:

- ~ Reports from Broadcast Asia and Radio Montreux*
- ~ Who's who at WorldDAB*
- ~ Next issue out 21st August*

Visit the WorldDAB Website:

www.worlddab.org

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