



OFCOM CONSULTATION - THE
FUTURE OF DIGITAL TERRESTRIAL
TELEVISION
BECTU RESPONSE

BACKGROUND

1. The Broadcasting Entertainment Cinematograph and Theatre Union represents approximately 27,000 members across the audio-visual and cultural industries in the UK. Amongst our members are many workers who research, design, install, or operate digital TV broadcasting systems, as well as thousands of others involved in creating content for TV and cinema exhibition.
2. This submission concentrates on the future provision of High Definition TV services, both free-to-air and subscription or pay-per-view, on the Freeview platform, as well as offering observations about the technical feasibility of a number of suggestions contained in the consultation paper.
3. We believe that the introduction of High Definition TV services on Freeview is critical to the platform's long-term survival as a predominantly free-to-air provider of diverse, good quality, programming, underpinned by public service values. Freeview is one of only two routes by which UK households can receive TV output free at the point of use, and compared to the only alternative, the Freesat service due to be launched this spring, has the attraction of significantly lower equipment costs, and at present, no need to install new antennae in the majority of situations.
4. Both the production, and consumption, of High Definition programming are growing in the UK, and we fear that Freeview will come to be viewed as a second-class platform unless it is able to offer a significant range of HD services in the future. Increasingly programme-makers are choosing to acquire picture content in HD form, either because there is an immediate possibility of exploiting the finished product in markets that demand the format, or because they want to "future proof" programming that is initially required only in Standard Definition, but may have a further life in sell-through markets.
5. Equipment for acquisition and post-production of HD material is falling in price, and in some programme genres the on-cost of producing HD, rather than SD, programming is already marginal. It is reasonable to expect that SD display screens will go the way of monochrome TVs

and computer monitors, vinyl record players, and, four years before DSO in some areas, analogue domestic TV receivers.

6. This has led us to conclude that the HD format will become the norm over time, as the production industry switches over, and domestic consumers replace their equipment. The eventual dominance of HD is predictable, even though some practitioners argue that the quality improvement of HD pictures compared to SD is often minimal, or imperceptible, by the time a heavily compressed signal is displayed on poorly-aligned domestic displays.
7. We welcome the emphasis Ofcom places on the role of public service broadcasters in delivering HD services, and support the assertion that handing them principal responsibility for operating and running services on a single multiplex is an effective path to delivery. However, as a means of incentivising households to make any necessary investment in new equipment, we also believe that other, commercial, broadcasters should not be constrained by bandwidth restrictions from offering HD services to complement the public broadcasters. To eliminate any doubts though, Ofcom should explicitly state that HD services on Mux B will be free-to-air.
8. We also support the view of Ofcom that an interventionist approach by the regulator is the best means of delivering benefits to consumers in an efficient manner. Ofcom's efforts to roll out new standards and services on Freeview, without the need for continual upgrading of consumer equipment, is welcome, although the introduction of DVB-T2 and MPEG-4 will inevitably necessitate the replacement of most currently-installed set-top boxes.

TECHNICAL ISSUES

9. Ofcom's analysis of the current 6-multiplex Freeview network, and the constraints it places on the carriage of new HD services appears broadly correct, and our members working in DTT-related disciplines agree that MPEG-4 encoding is the only viable system at present for efficient compression of HD pictures. We would also agree that it is prudent to plan ahead for the orderly introduction of the DVB-T2 standard.
10. However, many practitioners disagree profoundly with the forecasts offered by Ofcom's research for the future gains in bandwidth provided by new standards, compression algorithms, and improved coding equipment. For example, serious doubts have been expressed about the projected 1.6-2.0 Mbits/s for SD channels expected to materialise by 2012. Although some services available on Freeview are distributed at bitrates close to this now using MPEG-4, picture quality, even to an untutored eye, is barely acceptable, and basing the future allocation of DTT bandwidth on such a low figure may prove to be ill-advised.

11. To support this view, we draw on research by the University of Essex's Video Research Laboratory, completed in November 2006, which offers a less sanguine view of future bit-rate reductions than the Ofcom paper.
12. Technically-qualified members have also expressed doubts about the anticipated 6 Mbit/s increase in bandwidth once multiplexes currently operating 16QAM switch to 64QAM. While we support the change in mode for all multiplexes, we are advised that some of the gain will be cancelled out by the need for more forward error correction, and/or increased guard intervals, if the coverage target of 99.5% of households is to be met (even with the improvements offered by DVB-T2 in respect of FEC).
13. If, as we believe, Ofcom's fundamental assumption about increased bandwidth is flawed, there are profound implications for the immediate (2009-2012) allocation of space on Freeview, and the longer-term prospects of the platform being able to offer services predominantly in HD without severely limiting the number of individual channels available.
14. We suggest that an urgent feasibility study should be conducted into the ability of the two PSB multiplexes, Mux 1 and 2, to assimilate all the services planned to migrate from Mux B under the Ofcom plan, without degradation of quality in either audio or video streams. If bandwidth cannot be found for all current Mux B services elsewhere on the platform, we believe that Ofcom will need to re-visit its allocation plan from 2009 onwards.
15. If capacity is proven to be available, we support the concept of clearing Mux B, and argue that all bandwidth on that multiplex should be allocated to HD television services. We note that Ofcom anticipates space for 3 channels of HD, and refer again to the opinion of many of our members who work in the field that the regulator's predictions for bit-rate reductions are over-optimistic. Rigorous trials are needed to determine exactly how many HD channels can be accommodated on a single Mux operating 2k DVB-T2 in 64QAM mode using MPEG-4, even after the transmitter power increases which are inherent in DSO.
16. The criteria for awarding HD channels to existing public service broadcasters should take full account of the quantity of UK-made programming they intend to provide. We believe it to be in the interests of the UK production industry that initial HD services should be biased towards newly-commissioned material, rather than acquired programmes which would inevitably be sourced mainly from the US.
17. However, we would not support Ofcom's stipulation that there should be no up-conversion from SD on the HD channels. Especially in the initial period, broadcasters operating channels on Mux B may need to resort to a proportion of SD material in order to offer a balanced mix of

programming (including for example news and current affairs). If early schedules are not allowed to contain a modest amount of SD programming, the HD channels could become technical showcases for whatever HD material happens to be available, reminiscent of the "trade programmes" of the mid to late 1960s which demonstrated 625 line, and then colour, television.

18. Equally, we would challenge Ofcom's intention to insist on the 720p format for all transmissions. From the perspective of most practitioners this is a poor implementation of HD, compared to the vertical resolution available currently on SD. The format is also ill-suited to live events and sport, which along with acquired feature films and new-make drama, will be important components of the programme mix. There is a strong lobby among those involved in producing, editing, coding, and distributing TV programmes that the 1080i format is more appropriate, even though bandwidth requirements are higher.
19. At the very least, we envisage two HD 1080i channels on Mux B, possibly three if proven feasible. We suggest that at least one should be available to the BBC, and a minimum of one to the commercial PSBs.

A MORE AMBITIOUS PROPOSITION

20. The conflicting demands facing Ofcom are immense: the desire to limit the demand for new STBs and antennae among users; the difficulty of ejecting current operators from the platform; a desire to maximise the amount of spectrum available for new applications; and the uncertainty of exactly which technical advances will be adopted. This, in our view, has led to a relatively modest proposal for HD TV on Freeview.
21. We believe that Ofcom and the industry should begin planning for further technical developments that will significantly boost bandwidth, allowing a far greater number of HD channels on the platform, and enabling existing SD services to convert to HD without constraint.
22. Our proposition is that two UK-wide channels among the 14 to be cleared should be identified, and allocated to Freeview in order to operate a single frequency network using 8k DVB-T2, offering HD-only channels all in the same statistical multiplexing pool. This will provide a major increase in available channels, using only a small proportion of the DDR cleared spectrum.
23. In addition, Ofcom should urgently consider the impact of MIMO (Multiple Input Multiple Output) technology, a dual polarisation system which, according to researchers, will increase throughput on DVB-T2 multiplexes to 50 or 60 Mbits/s. This will require new antennae, which could be made available as part of DSO even before MIMO becomes a standard technology, and new set-top boxes, which may not be

available at early stages of DSO. (MIMO is unlikely to be included in the DVB-T2 specification).

24. We appreciate that new antennae are essentially distress purchases, but believe that those consumers who are forced to re-equip because of DSO would be willing to buy MIMO-capable aerials if this offered them the prospect of a wide range of HD programming in the foreseeable future. Similarly, many other consumers, who may already be receiving Freeview, may be persuaded to install new aerials and STBs to receive a comprehensive HD service once it is established.
25. In our view this courageous approach to HD, albeit requiring households to re-equip, is more likely to secure consumer loyalty to, and therefore the survival of, the Freeview platform, than a limited HD offering of 2-4 services (depending whom you believe). In a predominantly HD world, a restricted service on Freeview will be a mere curiosity, rather than a valued benefit for free-to-air viewers.
26. In summary therefore, while we support the Ofcom plan for HD services on Mux B, subject to our observations above, our preferred, eventual, option would be an 8-multiplex network, running on 8k DVB-T2 and MPEG-4, with two single frequency networks using MIMO modulation devoted exclusively to HD channels offering mostly 1080i new-make programming, sourced as far as possible from the UK.
26. Under this scenario, a cohort of early adopters can install new MIMO-capable antennae, either as a direct result of DSO, or to take advantage of HD services, paving the way for a comprehensive HD proposition which would encourage other consumers to consider new aerials and STBs in due course. Once the installed base of MIMO equipment has grown to a significant percentage of households, and if multiplex capacity improvements materialise, it may be possible to begin a gradual switch of the 6 current Muxes to MIMO. This would leave consumers using older equipment a slowly reducing range of services, and may eventually allow the two reserved HD multiplex channels to be re-allocated.