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Expanding Arqiva into high definition playout

ATG Danmon is one of the world's most successful providers of high-end reliable and easy-to-operate integrated systems for broadcasters and programme makers.

Active in Europe, Asia, Africa and the Middle East, ATG Danmon is part of the Dan Technologies Group which operates from offices in the United Kingdom, Germany, Denmark, Norway, Portugal, Spain, Sweden, the United Arab Emirates and Vietnam.

One of Britain's leading telecommunications companies, Arqiva is the transmission provider for all terrestrial television and most radio services in Britain. Customers include major broadcasters such as the BBC, ITV, BSkyB and the independent radio groups, major telco providers including the UK's five mobile network operators, and the emergency services. In addition to its UK presence, the company is active in Ireland, mainland Europe and the USA.

Arqiva is structured into three business units:

Terrestrial Broadcast: provides transmission for all UK terrestrial TV broadcasters, including the new networks being built for the digital switchover. Analogue and DAB transmission is also provided for BBC Radio and most commercial radio stations. Arqiva owns and operates two of the six UK digital terrestrial TV multiplexes, enabling major media companies to bring their TV and radio services to Freeview.

Satellite & Media: provides global communication platforms to enterprise, government and broadcast customers around the world. It owns and operates teleports at key locations including Los Angeles, Washington, London and Paris, as well as comprehensive satellite capacity, an international terrestrial fibre network and extensive media facilities.

Wireless Access: provides cellular, wireless broadband, voice and data solutions for the mobile communications, public safety, local government, and commercial markets. Arqiva is the largest independent provider of radio sites in Britain and Ireland. With its own spectrum, the company can provide complete mobile communications networks including backhaul links.

SD to HD upgrade

ATG Danmon recently completed a major SD to HD upgrade for Arqiva broadcast transmission centre at Gerrards Cross, Buckinghamshire. The expanded system enables Arqiva to process and transmit four fully-operational 1080i HD channels as well as six new SD channels. It includes the installation and equipping of a server-based ingest suite, playout assembly facilities and four presentation desks.

The ATG Danmon engineering team provided management, engineering and wiring services, and ensured that the HD data path structure performs effectively throughout the system. Part of the brief was to carry out

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pathological tests on all the video and audio signal distribution infrastructure, adding enhancements where necessary. ATG Danmon also advised on programme quality-control as well as configuring Dolby audio elements to ensure correct manipulation of metadata, precise loudness control and accurate handling of multi-channel audio from stereo sources.

The new installation at Arqiva includes an ingest operator's desk, an Apple Final Cut Pro editing desk, four presentation desks, one transmission control desk, Axon and Kramer interfaces, Bluebell fibre-optic converters, Chromatec in-vision audio monitors, Custom Consoles furniture, Dual Xeon 4 x 90 day compliance servers, Genelec active loudspeakers, Harris test, monitoring and timecode equipment, Miranda monitor multiviewers (driving seven 52 inch Sony plasma monitors), Omneon and Omnibus servers, 13 Pixel Power Clarity 3000 graphic processors, Pro-Bel routers and Softel cue

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pulse processors.

Equipment choice was predominantly Arqiva's apart from a specific branding equipment requested by the facilities first HD customer. Selection was otherwise based on favourable previous experience or simply because the tools were ideal for the intended tasks.

General infrastructure
Axon was Arqiva's existing preferred choice of glue equipment throughout the playout area. Bluebell fibre optic and Chromatec in-vision audio monitors and Genelec loudspeakers were also selected based on good prior experience. Pro-Bel Sirius routers and Softel cue pulses generators also formed part of the HD expansion. The Pixel Power Clarity 3000 HD equipment was requested by a specific Arqiva customer though other clients have since shown interest in its capabilities.

Ingest
Upgrading to 1080i 50 HD from SD required all the servers to be equipped to handle much larger files. The main HD channels are all live ingest arriving via optical fibre lines. Content from America is processed from 720p 60 through Snell Alchemists motion-compensating standards converters. Each incoming programme or interstitial is captured to the ingest server, QC being performed immediately and a browse clip generated. The file is then moved to the transmission servers or the archive.

Some content arrives on FTP, and other material on disc drives. These join the same workflow. QC is a mostly by spot-check eyeballing.

Getting large files quickly from one point to another needed attention. A sports game might go into extra time yet be scheduled for replay before that extra time was due to finish.

Playout
The system allows playout from the ingest servers if a file comes in too late to get through to the transmission servers. Arqiva has always used Omneon servers for ingest and playout," comments Simon Barrett, Technical Sales Support Manager at Arqiva Satellite & Media. "Line-rate and aspect-ratio conversion are all dealt with inside the Omneon HD ports which automatically detect the presence of an SD clip on the playlist and processes it accordingly."

For playout presentation, Arqiva chose Miranda Imagestore IS750 mixers, having used them in the past in the SD domain. ATG Danmon worked in close co-operation with

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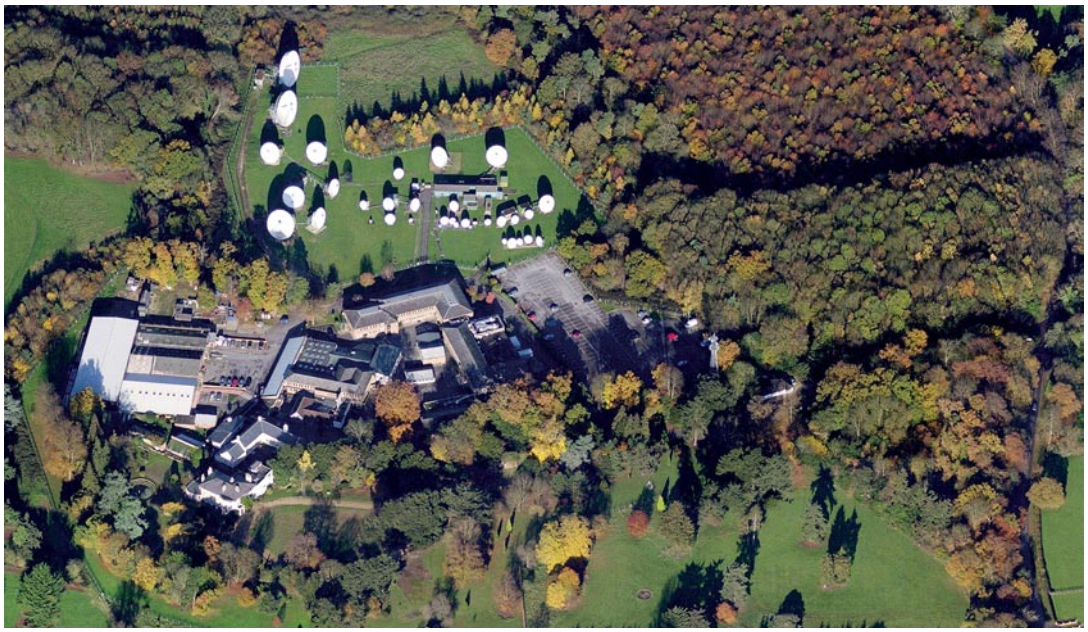

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Arqiva's in-house technical support engineers and with Miranda to produce the required outputs from the mixer. This involved rewriting some of the firmware so that any audio not already processed as a Dolby track by the time it reached the mixer input would automatically be processed to ensure a continuous stream of Dolby E. The HD and Dolby elements went very smoothly. Dolby re-framers were added to all incoming lines to ensure accurate audio and video timing.

Secondary transmission chain

A backup transmission chain is maintained for all of Arqiva's playout channels. How much equipment goes in the backup chain depends on each customer's requirements. The servers operate in A and B configuration, the B output going via a separate router to the B input of a 2 x 1 switch which will also give an alarm if any problem is detected on incoming video sync, silence or Dolby presence. The operator can see which channel is affected, press the appropriate button and go to the B leg. The compliance server is an existing system supplied in 2005 at a time when no dedicated server would provide the same capabilities.

Harris TVW9100PKG test equipment was selected on the basis that one unit could handle HD waveforms, decode any Dolby signals and display useful information about what the Dolby signals are doing. The Harris TVW9100 can also output deliver Dolby 7.1 with up to eight separate outputs.

Miranda's Kaleido X multi-image display processor was chosen by Arqiva for its ability to handle 96 inputs and 8 outputs which makes it very flexible and saves on DAs. The picture monitors are 52 inch 1080-line LCDs, fed via DVI to get the highest possible quality. The LCDs replaced earlier plasmas which suffered from severe burn-in behind logos and monitor-matrix tile-gaps.

Audio monitoring is via Genelec active loudspeakers which offer good sound at a good price and are easy to integrate.

Gearing for the future

The Arqiva expansion into HD is one of several such projects undertaken in recent years by ATG Danmon. This is a migration that looks set to continue throughout the world given the ever increasing affordability and popularity of large-screen 1080-line LCD television receivers.

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