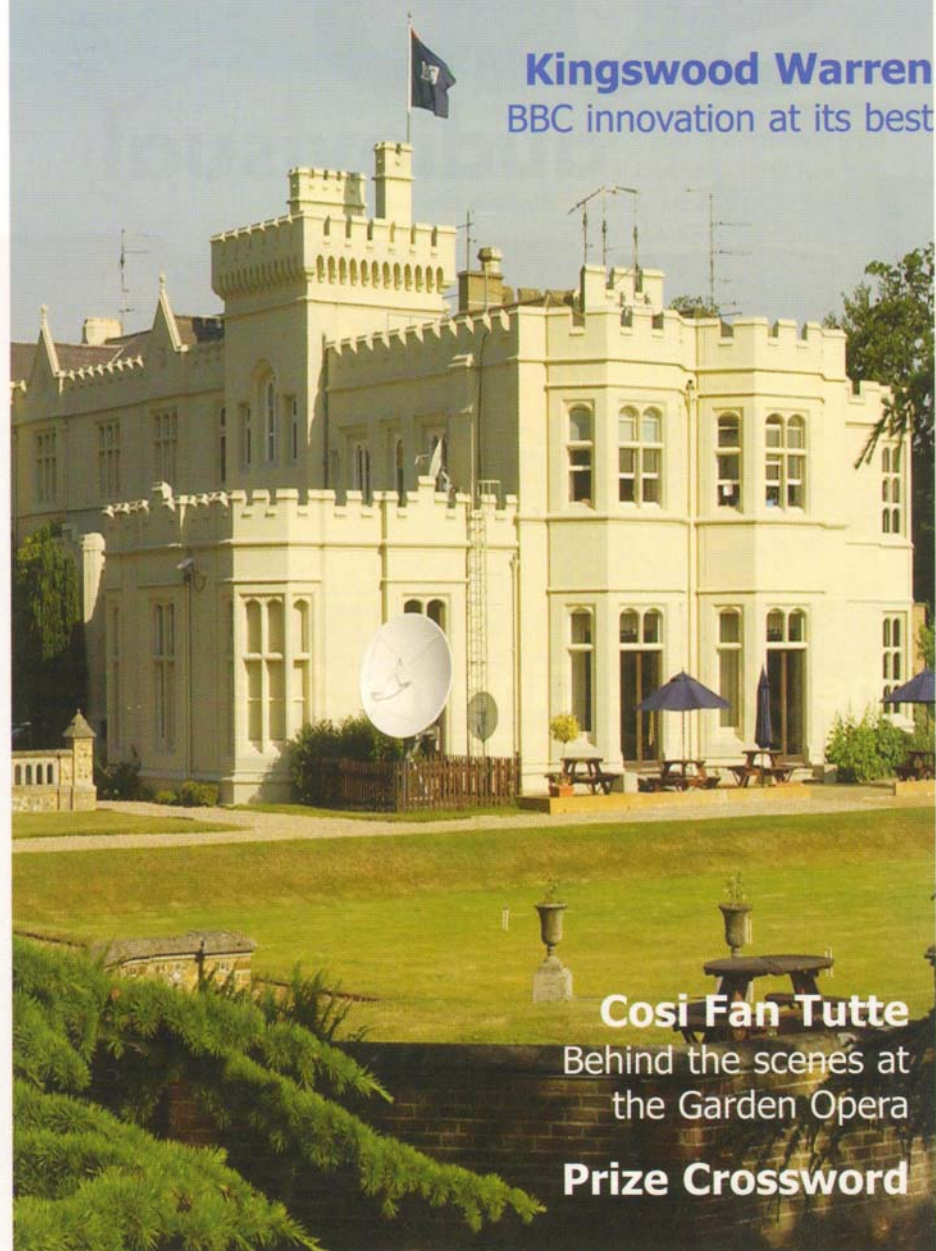


CONNECTION

Kingswood Warren
BBC innovation at its best



Così Fan Tutte
Behind the scenes at
the Garden Opera
Prize Crossword



Life in the Warren

Connection lifts the lid on the amazing technology that is developed at the BBC's research HQ

A hive of activity abounds within the perfectly white-washed walls of the gothic mansion, Kingswood Warren. The building may date back to the early 1800s but its myriad corridors play host to 180 engineers, mathematicians and scientists all working at the forefront of the world's most ground-breaking broadcasting technologies. While many projects are collaborations, it's fair to say the BBC has been the instigator and key player in such major innovations as NICAM digital stereo, Digital TV, RDS traffic messaging, Teletext, High-Definition TV and real-time, live graphics.

At BBC R&D a new technology can

start from just a glimmer of an idea explains Judy Parnall, Principal Technologist. "It starts by someone thinking, 'wouldn't it be interesting to have a look at X and can the BBC use it?' We develop the technology, create a prototype, work on the standards so that it's an open technology and then sell the license for manufacture."

Pictures of real players are transposed onto a virtual stadium which is synchronised with the real pitch.

It's a process that can take many years, and some span the career lifetime of engineers. "The full research cycle can take up to 30 years from time of inception to reaching people's front rooms," explains Judy.

One such project was the launch this summer of HD TV for the World Cup, which has been over 20 years in the making. The technology was first tested

on an analogue TV as deep as it was wide, weighing 184kg and costing £1,000 per inch. The prototype has pride of place in Alastair Bruce and Dr John Zubrzycki's lab. Myriad flatscreen TVs clutter the space with a huge projector taking centre stage creating the feeling of entering an electrical store.

"One of the first tests we did was on the 1989 Wimbledon finals and since then the challenge for us has been to make High Definition TV a standard that was more affordable," explains Alastair. Part of that challenge has been to deliver HD on terrestrial TV. "We have a problem of a lack of spectrum space in which to deliver the new service," says Alastair. "But as the analogue signals are switched off more spectrum is released for digital TV as well as HD channels." It has been less complicated in creating it for cable and satellite with BBC R&D involved in the technology for Sky's HD set top boxes.

Trials are also being carried out for Internet Broadband TV and possibly HD 3D TV – "The challenge for that

would be to create a service that didn't require the whole family to sit there with 3D glasses on and all in the same position," says John.

As more programmes are recorded in HD the BBC aims to make the transition to a totally HD service by 2010. R&D was also behind the technology in creating interactive services. Not only for its own channels but also in creating Sky Plus which itself took 10 years to develop.

Dr Graham Thomas' eyes light up when he talks about his work. As Principal Research Engineer he guides a team of five engineers

through innovations in 3D graphics and visuals. Creating such technical wizardry as used in the BBC's state of the art 2001 and 2005 Election Night shows. Where Peter Snow and David Dimbleby presented from a virtual studio with floor to ceiling live 3-D graphics and the famous swingometer. David Dimbleby was also able to watch the unfolding drama on a circular table with 3-D bar charts and spectacular graphics illustrating the results from around the country as they came in.

"The full research cycle can take up to 30 years from time of inception to reaching people's front rooms."

Left to right: Children's ground-breaking game show BAMZOOKI; ceiling markers used in the 'free-d' technology

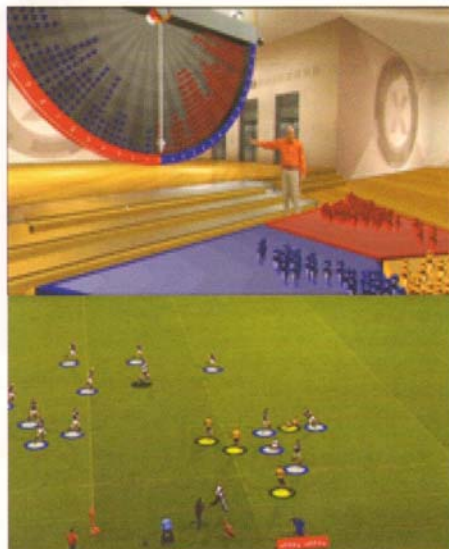


Photos: BBC; John Barrett

Licensed under the name 'free-d' it's a technology that has many applications. It's been used by Hollywood in Steven Spielberg's *AI* (Artificial Intelligence) while other technology developed by Graham's team can be credited with Harry Potter's disappearing cloak – Harry was wrapped in a grey 'retro-reflective' cloth that made him invisible. The fact that the technology is also now used daily by ITV for its 'virtual studio' news bulletins is testament to the BBC's commitment to make their technology available for all.

One of its most fun applications is on what has been described as 'the world's most innovative game show'. BAMZOOKi, on children's channel CBBC, is a mix of live graphics with contestants in the studio. The kids design their own virtually intelligent creatures – 'Zooks' on a computer and then watch them do battle or race across a table in front of them. A projector throws the images down on the table for the contestants to see and allows the cameraman to frame the shot while viewers at home see the graphics in real time. Not only is the end-result fascinating to watch but it also cuts out the need for post-production.

Sports analysis is another area that has greatly benefited from Graham and his team's innovations. Not least from the award-winning and revolutionary Piero Project which generates virtual views of sporting events and adds 'tied-to-pitch' graphics. This enables viewers to see 'play' from angles that cannot be captured by conventional cameras. Pictures of real players are transposed onto a virtual stadium that is synchronised with the real pitch. This



Election swingometer and 'virtual football pitch' with 3D graphics

'new toy' first went on air during the BBC's Match of the Day in 2004 and an HD version was used for the first time during the BBC's World Cup coverage.

Not only are the studio pundits able to see offside, forward passing and other offences from the best angle but they get another way of analysing crucial incidents in the match and hence explain the action more effectively to the audience.

So what of the future? A prototype with 16 cameras has been created and tested around Old Trafford that will linkup with 3D graphics. And by using the lines on the pitch as markers, a true 3D model of the game can be created. "It's two years off but when it's ready the viewer will be able to see the view of the goalie or the striker not usually picked up by a single camera angle. It will be an even more exciting new 'little toy'!" enthuses Graham.