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WHITE PAPER

THE BRAINSTORM GUIDE TO 3D GRAPHICS

Being at the cutting edge in technology for two decades, allowed us to define the foundations of many technologies. Brainstorm White Papers share key information about virtual studios and 3D real-time graphics.

We can define graphic as any element, alphabetical, visual or audiovisual, created to transmit information. In fact, letters or type fonts are also a kind of graphics. Information graphics are as old as Humanity, as ancient representations could be understood as a kind of graphics, that many consider a form of art. However, it is not the intention of this document to review history but to dedicate this paper to the evolution of broadcast graphics, from the analogue times to the complex 3D real time graphics we are now used to see and deliver.

Broadcast graphics are as old as television, and as important as the broadcast content itself because they transmit the station's branding and also the company's ability to display information attractively. So what started as simple hand-written displays or frames, now is the closest item to advertising and corporate identity a broadcaster can show up.

Broadcasters need to display information constantly, from program titles, news headlines or bumpers to self-promotional material. Most of these pieces are the result of the artist mind, and its complexity depends on the creativity of the designer and the tools available to achieve the desired results.

Brief History

Early television times' designers produced painted graphics and Letraset captions and titles that were then broadcasted using camera caption, a technique commonly present until the mid eighties.

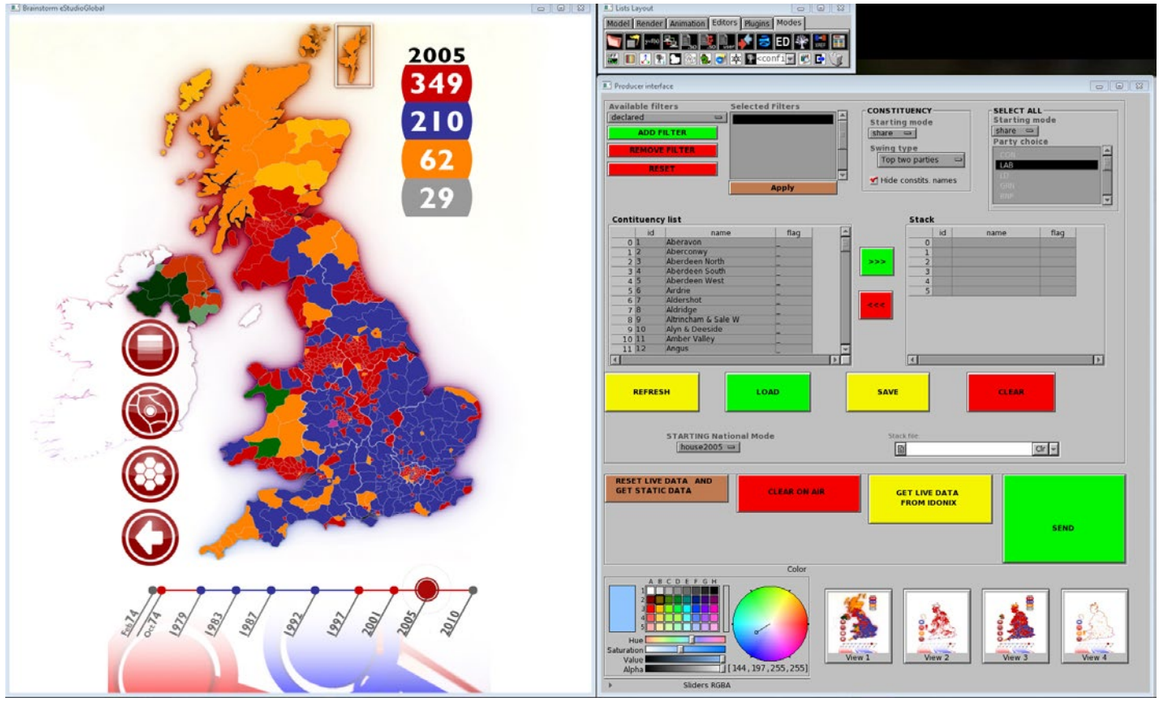
The decade of the 60's saw the early stages of electronic titling with the electronic super-imposition of text. In the mid 70's this started to be a common technology as simpler titling systems such as those from Aston or Chyron were a commercial success, as much as to become generic trademarks for CG systems. Also, broadcast got into the digital era when digital frame synchronizers and digital picture-in-picture effects appeared, digital video mixers and chroma keying technology started to be common, while digital video effects (DVE) systems were available at the end of the decade.

The early 80's saw a major revolution in graphics with the launch of the Quantel Paintbox, the very first graphics system that allowed graphic designers to unleash their abilities using an electronic equipment rather than painting over paper or wood to then capture with camera the piece. The Paintbox introduced the pen and digitizing tablet as a new interface that then become common for the graphic artists to operate. Soon after, systems like the Quantel Mirage introduced real-time 3D video effects operating in a 3D environment (although requiting extensive ad-hoc programming).

At the same time 3D graphics, which were a niche technology, started to widespread with the end of the decade, moving from expensive dedicated systems to software running in commercial computers. The early 90's saw the explosion of the 3D in special effects, movies and television, and the early, very digital-looking images of the late 80's started to evolve to more realistic productions. Movies like Terminator 2, Abyss or Jurassic Park changed the minds of the audience to prefer seamless integration between graphics and reality rather than the bright, reflective metal objects common in the 80's. Also, hardware advances that increased the rendering speed made possible the utilisation of 3D in daily television graphics. Real-time, however, was a real issue, and pioneering companies such as Brainstorm had to use expensive military supercomputers such as SGI Onyx and even invent new technologies to achieve strict real-time performance in 3D graphics.

Data-driven graphics

Possibly one of the most common categorisation in broadcast graphics is the difference between daily graphics and purpose-built graphics. The first do not require great deal of creativity as they most commonly are created from pre-existing templates, the re-purposed to fit actual demands. Graphics of this kind are those such as weather graphics, stills, bumpers, lower thirds, maps, etc., all essential to promote the channel's branding providing the information required, and are produced in large amounts from pre-defined templates. On the other hand, purpose-built graphics such as titling sequences, openers, promos or supporting information normally require the designers' time and creativity to become an unforgettable piece. They might take days or weeks to be created (such as a season's new look) but in some occasions they might be required immediately to support a given information. At this time, flexibility, speed and a complete toolset are essential to provide the looks the audience is now expecting.



Other interesting issue, especially when creating News, Sports, Elections or Financial graphics, is the ability to automatically integrate external data. Real-time 3D graphics often require the interaction with external data, such as data feeds, stock exchange data and many more, so they animate depending on the incoming data. Election graphics is a perfect example of this, as the information changes every time, all the time, and the graphics (bars, charts, chamber's composition, geographical distribution...) need to reflect those changes as soon as the data is received. Therefore, an automatic update of the graphics depending on the incoming data, changing in size, colours or any other parameter, is essential to provide the coverage required in modern television programs.

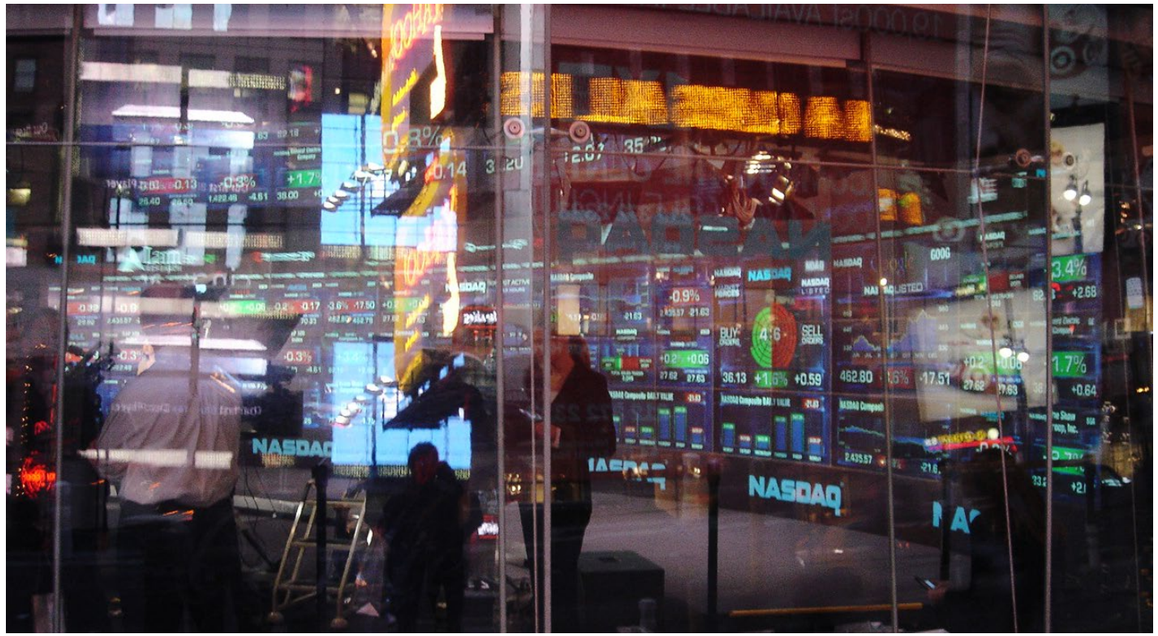
Also, the ability to display complex data for applications such as Financial tickers or large displays (such as the

NASDAQ information screen in Times Square, the largest stationary videowall in the world when it was installed) is essential to provide the audience with large amounts of data displayed in a very comprehensible way.

Collaborative Workflows

Broadcast graphics today require the participation of different departments. Designers have evolved from creating 2D stills to produce 3D real-time animations and many sections of the department, such as news graphics or CG specialists, had to cope with the most radical changes, both because of the raising of new technologies and the evolution of other areas such as newsrooms. The days of the dedicated hardware islands are long gone and today's broadcast graphics require designers with multiple abilities plus flexible and collaborative software solutions that could integrate in different environments such as newsrooms.

The creation process must be helped by technology, so designers could concentrate on creation. Leading designers or art directors create pieces and concepts that the rest of the team then use to create all the versions needed, while real-time graphic solutions assure the on-time delivery of any piece. These solutions should facilitate the creative process by allowing designers to share elements and explore different alternatives or styles simultaneously, so the combination of processing speed (or real-time graphics) with a vast dedicated graphics toolset allows designers to explore more possibilities with less effort. Intensive usage of network solutions, common libraries and shared media also enhances the collaborative process.



On top of that we find, as always, the constant need to provide quality graphics in close-to-air situations, plus the requirement to deliver an increased amount of daily graphics that are more complex because of the requirements of the channel branding. That is the reason why collaborative workflow in graphics is increasingly important also on the creation stage often requiring the concourse of different individuals to complete a project. These individuals might be specialized in areas such as video effects, CG, 2D graphics, 3D modelling, etc., and work with different software, so the ability to integrate all the available elements and share files with software packages, such as 3D Max, Maya, Photoshop, Illustrator and many other that are daily used to finish up pieces or complete projects, is essential. Brainstorm products, for instance, support practically all commonly used image and video formats, at the same time that import 3D Max, Maya, Illustrator or Photoshop files directly.

Brainstorm has learned both from the legacy Aston operation and from the experience of its wide user base, providing the new Aston 3D with an enhanced real-time user experience that facilitates the design process, so designers can concentrate on creation while the interface adapts to their preferences. Also, along with its possibilities of becoming hero system for standalone operation, one of the main premises in the development of Aston 3D was the integration of the product into a collaborative workflow environment. Not to mention its ability to integrate and interact with Brainstorm's virtual set environments enhancing its Augmented Reality capabilities.

At the end of the day, broadcast graphics depend on the designers' creativity and the flexibility the available graphics solutions provide. With this in mind, Brainstorm's commitment has always been to provide the fastest and most flexible and powerful toolset to permit designers to achieve what they have just imagined.