



INFOIMAGING@Kodak

ENTERTAINMENT IMAGING POSITION PAPER
AUTUMN 2002



In the entertainment industry, technological change is a complex process. It endures only when the new technology makes creative, business, operational and technological sense to everyone involved—to the filmmakers, to the studios, to the theater owners and to audiences.

That's why motion picture film continues to be the medium of choice for the movies. There really is no better way—yet—for making and showing images and telling stories destined for a big screen. Film will have a very long life in motion picture theaters—and the world's best-loved movies will continue to be shot and shown on Kodak film.

But Digital Cinema is coming—in several ways—and Kodak also will take a leadership position in that arena. And, from the beginning, Digital Cinema will involve devices, infrastructure and services and media—all of the elements of infoimaging, a \$385 billion industry created by the convergence of image science and information technology.

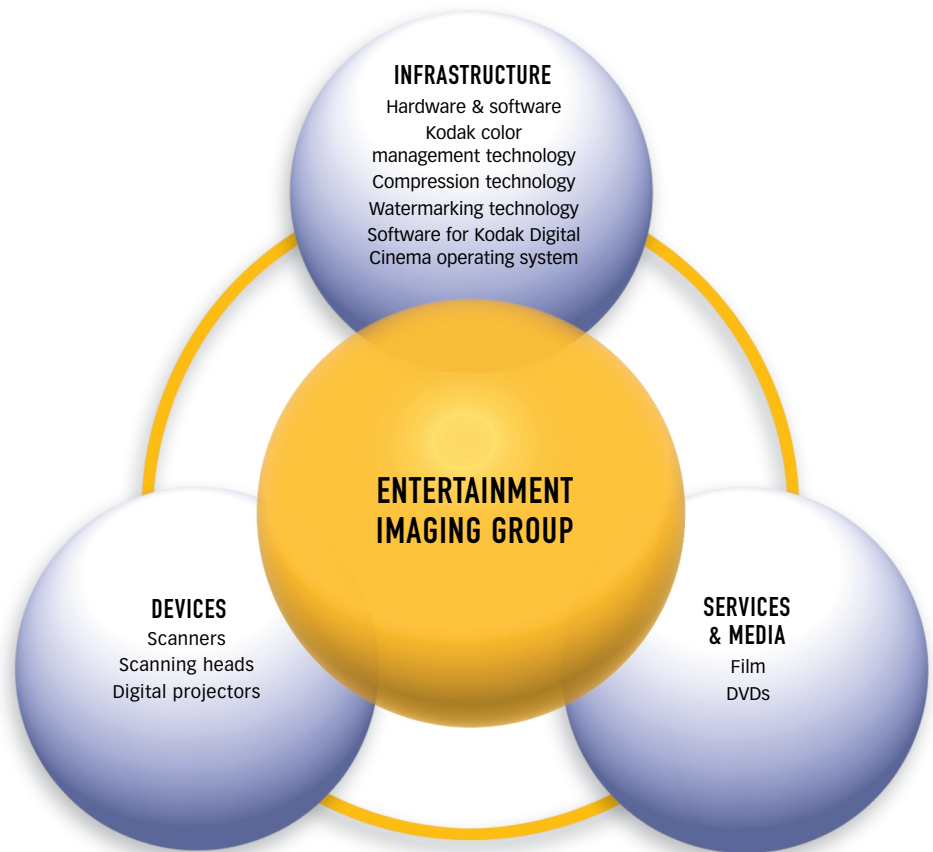
For Kodak and its Entertainment Imaging division, infoimaging represents an enormous opportunity to broaden our value chain with customers in the entertainment industry—a chance to reinforce old bonds, initiate new ones and forge future linkages.

BEFORE INFOIMAGING...

Kodak is, by far, the world's leading supplier of film to the entertainment industry—for the production of feature films, TV programs and commercials. While that will continue, infoimaging offers opportunities to expand our business in new ways—with new products, new services and new solutions to new customers in new channels.

As a supplier of motion picture film, the value chain connecting the Entertainment Imaging division to the motion picture studios is fairly simple and linear—with just a few points from which Kodak derives value. In the simplest of terms, filmmakers shoot a motion picture on Kodak motion picture film, manually edit the scenes into a movie, and distribute the film to theaters, where it is spliced manually by staff and projected onto screens. While Kodak continues to gain major benefits from this value chain and continues to be the leader in new imaging advancements, the value chain essentially remains a linear one.

The infoimaging value chain of today is no longer linear but rather web-like, with Kodak touching customers at multiple points within the web simultaneously.



But that is changing as infoimaging expands opportunities for us to enhance the experience for moviegoers and provide new options to the film community that make creative, technical and business sense. Our Cinesite subsidiary is leading the way in digital editing and color mastering of motion pictures. And our advancements in the realm of Digital Cinema are classic examples of the innovations and new products created by the convergence of image science and information technology.

The infoimaging value chain of today is no longer linear but rather web-like, with Kodak touching customers at multiple points within the web simultaneously. Today's value chain includes not only motion picture film but also scanners, Kodak's Cinesite editing software and infrastructure, satellite connections, color management technologies, compression technologies, operating systems, and digital projectors with watermarking capability.

Infoimaging is made up of three rapidly expanding markets: devices, infrastructure

and services and media. These three markets make up what we call the \$385 billion infoimaging industry, and Kodak, especially the Entertainment Imaging division, has the distinction of being one of the few players in all three segments.

- Devices are products that capture, view, digitize and output. That's scanners, scanning heads and digital projectors, to name just a few.
- Infrastructure enables images to be processed, stored, edited, transformed and transported in ways that preserve and extend the filmmakers' vision. That's hardware and software, including Kodak color management technology, compression technology, watermarking technology, and the software that enables theater managers to use the Kodak Digital Cinema Operating System in ways that feel "intuitive."
- Services and media allow images to be shared and preserved. That's film, DVDs, etc.

Digital Cinema is developing into two very different applications—to improve and extend the “pre-show” offerings in cinemas and to eventually replace/supplement film for “showtime” use.

INFOIMAGING IN ACTION

Entertainment Imaging boasts some of the most exciting developments in infoimaging. Although film-based projection systems will continue to show the majority of motion pictures for long into the future, there is a growing interest in Digital Cinema.

Digital Cinema is developing into two very different applications—to improve and extend the “pre-show” offerings in cinemas and to eventually replace/supplement film for “showtime” use. Each application is developing with different requirements, moving at different speeds, with different components and different objectives. Kodak is working to take a leadership role in both applications.

DIGITAL PRE-SHOW

Initially, low-cost digital projectors will replace the slide projectors used especially in U.S. cinemas to show images on the screen before the motion picture begins. With these inexpensive digital projectors, exhibitors (theater managers) can expand the type of content they offer in the pre-show—to include music videos, “behind-the-scenes/making-of” movie features, and even special cinema commercials. The result can be an extended and improved entertainment experience for audiences (targeted at specific audiences in conjunction with movie demographics), new opportunities for studios and other advertisers, and new sources of revenue for the theaters.

The Kodak Digital Cinema Operating System will enable cinemas to do all that—in a way that prepares them for the digital projection of first-run movies when those are widely available. The Kodak system contains all the capabilities that exhibitors need for today and for tomorrow.

The operating system begins with a network (infrastructure) that connects multiple devices—a main server (in a central location) and mini-servers (in each auditorium)—that are, in turn, connected to low-cost digital projectors. Pre-show content—including music videos, special

commercials, and other videos—can arrive on different media in several ways (on DVDs, via the Internet, etc.) and is stored in the main server. From there, it is distributed via the network to the different screens where it’s shown to audiences.

DIGITAL SHOWTIME

As the digital distribution of movies becomes a widespread reality, Kodak will introduce a high-quality, high-brightness Kodak Digital Cinema projector. The use of the projector with the Kodak Digital Cinema Operating System will open up new opportunities and new efficiencies for the exhibitors. Someday, movies will arrive via DVD, satellite, or fiber-optic cable. They will be combined with the appropriate pre-show entertainment, trailers and other materials, and scheduled, distributed, and shown on the various screens—all with the click of a mouse. Functions that take hours today will take minutes in the future as infoimaging becomes a reality.

Kodak’s high-quality, high-resolution, high-brightness digital projectors combine JVC’s 3 million-pixel chips with Kodak’s color management technology, putting twice the image resolution on the screen than any other digital projector. The Kodak Digital Cinema Operating System and digital projector, now in advanced prototype stage, are part of an end-to-end solution that will help preserve and extend the uniqueness of the cinema experience.

For cinemas and other places where content is shown, Kodak will provide a variety of business options. We will sell, rent, lease or offer long-term agreements that include everything—whatever arrangement makes business sense to our customers. And with an existing worldwide service team of more than 4,000 people, we’ll provide the service and support exhibitors need and expect from Kodak.

For studios and other content suppliers, Kodak will offer reliable content delivery—providing encoding, encryption, preparation, and distribution of motion picture content

to cinemas. Our goal is to combine Kodak's extensive experience in the industry, our strong customer relationships, our reputation for service, and our deep capabilities in imaging to take the uncertainty out of Digital Cinema and to take a leadership position as the market evolves and the opportunities grow.

As Digital Cinema—for the projection of motion pictures—gains momentum and becomes a reality, its entry point will be a process called "digital film mastering"—and here Kodak is also leading the way.

In fact, digital film mastering from Cinesite brings together all of the components of infoimaging. After a motion picture is shot on film, it is scanned and digitized using a scanning device such as a Philips Spirit Datacine scanner. Kodak provides (and has won two Emmy Awards for) the scanning heads for the Philips unit, which is marketed by Thomson Multimedia. Once the contents of the film are in digital form, a colorist works collaboratively with the cinematographer using digital color corrector and other software from Cinesite to digitally enhance the color, contrast and texture of the image. By shooting on film and manipulating the images digitally, the filmmaker has the best of both technologies—the unequalled quality of the film image combined with the speed and creative flexibility of digital. Neither technology alone offers all those capabilities.

Kodak's Cinesite infrastructure also provides filmmakers a range of options for producing digital special effects and integrating those seamlessly into the motion picture. Because the film is scanned and manipulated once for all uses, the completed movie in digital form can be written back onto film or on any other media format for any purpose, including Digital Cinema, DVD and other home video formats.

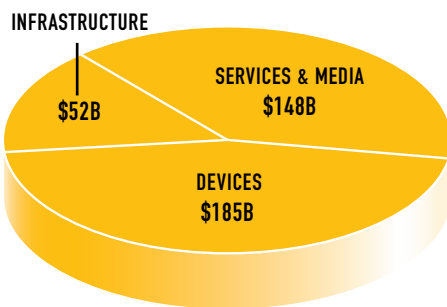
So, film prints and digital prints can be produced from the same master. And with Kodak color management running like a technical "thread" through all steps in the process, all images in all media can have the look, color and quality the filmmaker intended. That's important because film prints and digital prints will exist side-by-side for a long time to come.

Movie piracy is another area where Kodak technologies are making an impact in several ways.

First, to prevent direct copies being made of a digital file in the Kodak system, all content will remain encrypted ("scrambled") until it reaches the Kodak Digital Cinema projector. There, using "decryption keys" supplied by the studio for each movie, the file will be "unlocked" as the movie is projected on the screen.

But if today's piracy is any indication, most copies are not made directly, they're made off the screen—and Kodak technology also will help prevent that. According to the Motion Picture Association of America, thieves capture feature films using camcorders and sell bootleg copies, amounting to \$3 billion in lost revenues annually for the industry.

Kodak has been working on digital watermarking technology that can be used to identify illicit copies of movies. When a feature film is shown, a Kodak digital projector will continuously embed a small amount of data into the movie—a unique, invisible digital watermark identifying the date, time and theater of each individual showing. If a camcorder is used to illegally record the movie, the videotape also will record the invisible digital watermark. The video can then be examined using software that extracts the watermark to determine the time and place of theft, which can help with the apprehension of movie pirates.



The \$385 billion infoimaging pie slices into three big pieces. This trio of inter-related sectors—devices, infrastructure and services/media—connects to form the infoimaging market.

INFOIMAGING'S IMPACT

These examples are but a few of the many infoimaging success stories from the Kodak Entertainment Imaging division. Each of these examples illustrates how Kodak can strengthen its bonds with customers and create new opportunities for growth for itself and for customers in the motion picture business. The proof is in the results. Consider these statistics:

- Today, there are approximately 100 digitally equipped screens. By the end of 2002, Kodak expects there may be as many as 1,000 screens equipped with lower-cost digital projectors and networks. (More than 100,000 screens have film projection systems.) Analysts expect there may be 6,000 to 7,000 installed digital screens worldwide by the end of 2005.
- Kodak's Digital Cinema Operating System is currently being tested in the Mann's multiplex in Los Angeles. Later this year, Kodak plans to conduct the first beta tests of the Kodak Digital Cinema Operating System in selected multiplexes in key world markets. Full Kodak Digital Cinema systems, including content distribution services, will be available when the market is ready. Kodak is working actively with its customers and others in the industry to help develop technical standards, viable business options, high-quality systems, worldwide service and support and operational plans to help make affordable, reliable Digital Cinema systems a reality.

- Digital film mastering represents a new revenue stream for Kodak. Digital film mastering and visual effects also provide significant cost savings to the film industry because of the elimination of duplicative efforts.
- Cinesite has handled visual effects for more than 300 feature films and has implemented digital film mastering techniques in 12 films.

THE PATH TO GROWTH

As Kodak continues to broaden its participation in the entertainment marketplace—and as the options and opportunities in that marketplace expand—our capability with all elements of infoimaging (devices, infrastructure and services and media) enables us to serve customers in new ways. Technology is opening the doors to new products and services that we never before thought possible. This, in turn, is creating new opportunities for us to work with new and different companies—JVC as a supplier of chips for our digital projector and IBM as an IT infrastructure supplier for the Digital Cinema Operating System.

Infoimaging is the industry in which Kodak competes. It is a \$385 billion industry created by the convergence of image science and information technology. It extends our reach, our business and our potential success in every market where we participate.

In order to grow in this new industry, Kodak has identified four growth strategies that we call "The Critical Few." They are:

1. Expand the benefits of film. In Entertainment Imaging, we continue to expand our investments in film; at the same time, we believe that for Digital Cinema to deliver on its promise of offering sharper, brighter, more colorful images on the screen, those images must begin with film.
2. Drive output across all of our businesses. Digital Cinema is a new form of output. It joins print film as an increasingly growing medium of the future.
3. Make digital more useful for both commercial customers and consumers. Our work in Cinesite—where we continue to earn awards and recognition (and future business) for our capabilities in special effects and digital film mastering—provides one example.

4. Develop new businesses in new markets. Our introduction of the Kodak Digital Cinema Operating System takes us into the "pre-show" area and expands our relationship with cinemas, while offering new opportunities with suppliers of advertising services and owners of alternative content. Our content-delivery services—to prepare and deliver digital content—comprise a new offering to our studio customers.

Although infoimaging is a term that is seldom, if ever, used in the entertainment arena, the capabilities it encompasses—the digital equipment, the infrastructure, the well-known and widely respected film and support, as well as our expanding involvement in digital services—are fundamental to the future success of Entertainment Imaging.

For more information about infoimaging, go to:
www.kodak.com/go/infoimaging

