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## **Movie Captioning Technologies Summary – Updated 2006**

Technologies and formats exist, and are in use, to make movie soundtracks accessible through captioning. These technologies include: open captioning; screen-based (on-screen) caption projection systems; and seat-based caption display systems.

**Open-captioned film prints**, the oldest technology, is a process by which captions are applied to a motion picture print by use of a laser. The laser engraves the text onto each individual frame of the film, allowing white light from the projector to pass through the film and project white captions on the screen. Everyone in the audience can see the captions.

Direct studio distribution of open-captioned film prints began in 1998. In 2002, InSight Cinema, a non-profit open-captioned film distribution company, was formed. Films are distributed to over 50 major cities, and subsequently “bicycled” to nearby, smaller cities. For more information, see [www.insightcinema.org](http://www.insightcinema.org).

**Screen-based (on-screen) caption projection systems**, such as DTS’ Cinema Subtitling System (DTS-CSS), are available. With this technology, captions are synchronized with the DTS time code embedded on the film prints of movies. The caption data is stored on a CD-ROM disc distributed with the film. Captions are displayed through a second projector that superimposes them onto the screen. Everyone in the audience can see the captions. For more information, see [www.dts.com/cinema/dtsaccess](http://www.dts.com/cinema/dtsaccess).

**Seat-based caption display systems**, such as Rear Window<sup>®</sup> Captioning (RWC), are available. With this technology, captions are synchronized with the DTS time code embedded on the film prints of movies. The caption data is stored on a CD-ROM disc distributed with the film. Captions are displayed in reverse on an LED text display mounted on the rear wall of the theater. Only those viewers who have a transparent acrylic reflector panel at their seats are able to view these captions. For more information, see [www.mopix.org](http://www.mopix.org).

### **Captioned Movies**

The number of captioned films that are released is significant, and is expected to continue to increase as more movie theaters show InSight Cinema open-captioned movies and/or install RWC and/or DTS-CSS caption display equipment.

Captioned movie choices are limited to movie theaters that show InSight Cinema open-captioned movies and movie theater screens equipped with caption display systems, such as RWC and DTS-CSS. As the number of equipped screens increases, accessibility, movie choices, exposure, experience, development, and acceptance of captioning technologies will similarly increase.

## **New Caption Display Systems**

Alternative ways of displaying captions in movie theaters are being developed. For example, Georgia Tech Research Institute has developed a “wearable” captioning system.<sup>1</sup> In this system, captions are sent by a movie theater's transmitter to a wireless receiver device, such as a personal digital assistant (PDA). A micro display unit plugs into a PDA and is attached to a movie patron's glasses or is worn on a headband. The micro display unit is close to the eye, but the micro display screen appears to float several feet away. In this way, movie captions can be overlaid on the user's visual field.

## **Digital Cinema**

The transition from movie film prints to digital movie production, distribution, and display has been underway for many years. Digital movies will be significantly less costly than movie film prints to produce, duplicate, and distribute. However, the cost to convert movie theaters from showing movie film prints to displaying digital cinema is high. It is likely that the entire movie industry will need to contribute to make the transition to digital cinema economically viable. Further, because of the high cost, transition to digital cinema is likely to take place over a period of many years.

In 2005, Digital Cinema Initiatives, LLC, issued a set of standards to help manufacturers create uniform and compatible digital cinema equipment.<sup>2</sup> These standards contain specifications for the display of “timed text” (e.g., subtitles and captions) that can be overlaid into the main image, overlaid through a second projector on screen (e.g., DTS-CSS), or processed to an external display system (e.g., RWC, or wireless devices).

As such, it is expected that digital cinema equipment manufacturers will design and produce equipment that is compatible with the caption display systems used in theaters today.

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<sup>1</sup> See <http://gtresearchnews.gatech.edu/reshor/rh-w05/captioning.pdf>.

<sup>2</sup> See [http://www.dcinovies.com/DCI\\_Digital\\_Cinema\\_System\\_Spec\\_v1.pdf](http://www.dcinovies.com/DCI_Digital_Cinema_System_Spec_v1.pdf).

**Movie Access – Caption Display Systems  
Summary – Updated 2006**

	<b>On the Screen</b>		<b>Not on the Screen</b>
	<b>Open-captioned film prints (InSight Cinema)</b>	<b>Screen-based caption projection systems (DTS-CSS)</b>	<b>Seat-based caption display systems (RWC)</b>
<b>Availability from date of new movie release</b>	Movie patrons may wait long periods of time (weeks or months) after the release of a new movie to view an open-captioned film print.	Captions can be displayed beginning on the day a new movie is first released.	Captions can be displayed beginning on the day a new movie is first released.
<b>Show days and show times</b>	Showings are often booked for one or two shows on weekdays; generally not during prime times (Friday and Saturday nights).	Captions are often displayed at two showings (one matinee and one evening) on Sunday through Thursday, and one matinee showing on Friday and Saturday.	Captions are routinely displayed at every showing of a captioned movie shown on a screen that is equipped with a RWC system.
<b>Readability</b>	Captions burned into a film print may be hard to read when the film background is light.	Captions projected onto the screen may be hard to read when the film background is light. New software, expected soon, will allow selection of light yellow text to improve readability. Projecting captions on the black space below the screen may improve readability.	Some movie patrons report dissatisfaction with the readability of the reflected LED captions. Some movie patrons may have difficulty adjusting to the difference in field depths between the reflector and the screen.
<b>Viewing experiences</b>	Surveys suggest that captions displayed on the screen are generally preferred by movie patrons who are deaf or hard of hearing; just as movie patrons who are hearing are provided and use subtitles displayed on the screen when needed to understand the content of a movie soundtrack.	Surveys suggest that captions displayed on the screen are generally preferred by movie patrons who are deaf or hard of hearing; just as movie patrons who are hearing are provided and use subtitles displayed on the screen when needed to understand the content of a movie soundtrack.	Some movie patrons report dissatisfaction with seating limitations, the need to align the captions below the screen for consistent contrast, inconveniences caused by use of peripheral devices, and maintenance and dependability of the devices. A new reflector panel, available in June 2006, may address some of these concerns.
<b>Cost to movie theaters</b>	No additional equipment is needed to display or view open-captioned film prints distributed by InSight Cinema.	About \$4,950 for the playback unit and \$7,000 for the projector. Some theaters use their own pre-show projectors to display captions, so a separate projector is not needed.  Costs could be reduced when equipment is purchased in bulk and/or in combination because the DTS-CSS playback unit drives the caption disc for the RWC and DTS-CSS systems.	About \$4,950 for the playback unit; \$4,100 for the LED text display (not including installation costs); \$75-\$95 for each reflector panel; and a one-time \$2,000 license fee per screen.
<b>Other</b>	Some people believe that hearing audiences respond negatively to movies shown with captions displayed on the screen.	Some people believe that hearing audiences respond negatively to movies shown with captions displayed on the screen.	Some people believe that advocacy for RWC will be more successful because ADA legislative history and guidance says movie theaters are not required to show open-captioned movies (the only captioned movies available at that time), and because movie theaters display captions for RWC movies more often.